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STORAGE AND CONVEYANCE COMPONENT CONFIGURATIONS FOR THE PROGRAMMATIC EIR/EIS ALTERNATIVE ANALYSIS

Introduction

During Phase I, the CALFED Bay-Delta Program has identified three alternative solutions. Each alternative may be implemented in a wide range of potential configurations. This report documents the various configurations of storage and conveyance components suggested as a basis for programmatic impact evaluation. These alternative configurations for each of the three CALFED alternatives are suggested in order to explore a reasonable range of facilities, costs, and impacts in the Programmatic EIR/EIS. Each of the alternative configurations are designed to be consistent with the Program mission statement, the primary solution principles, and the program objectives.

It is important to emphasize that the configurations described in this report are subject to change based on input from stakeholders and the public prior to initiation of formal impact evaluation.

The mission of the CALFED Bay-Delta Program is to develop a long-term comprehensive plan that will restore ecological health and improve water management for beneficial uses of the Bay-Delta system. The primary objectives of the Program are:

- To provide good water quality for all beneficial uses;
- To improve and increase aquatic and terrestrial habitats and improve ecological functions in the Bay-Delta to support sustainable populations of diverse and valuable plant and animal species;
- To reduce the mismatch between Bay-Delta water supplies and current and projected beneficial uses dependent on the Bay-Delta system; and
- To reduce the risk to land use and associated economic activities, water supply, infrastructure, and the ecosystem from catastrophic breaching of Delta levees.

In Phase II, from June 1996 to September 1998, the Program will conduct a broad-based environmental and pre-feasibility review of the three alternative solutions and will identify the one preferred alternative.

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The Solution principles state that a Bay-Delta Solution must:

- Reduce conflicts in the system,
- Be equitable,
- Be affordable,
- Be durable,
- Be implementable, and
- Have no significant redirected impacts.

The objectives of the program are to improve:

- Ecosystem quality,
- Water quality,
- Water supply reliability, and
- Levee system integrity.

All three alternatives include the four common programs related to:

- Water use efficiency,
- Ecosystem restoration,
- Water quality, and
- Levee system integrity.

Overview of Alternative Configurations

The three Alternatives differ according to the type of Delta storage and conveyance configuration they have.

Alternative 1 - Existing System Conveyance where little or no modifications are made to flow capacity of the existing Delta channels. The alternative has three configuration numerated from 1A to 1C.

Alternative 2 - Through Delta Conveyance where a variety of modification to Delta channels could be made to increase the conveyance efficiency and capacity. The alternative has five configurations numerated from 2A to 2E.

Alternative 3 - Dual Delta Conveyance where a combination of improved through Delta conveyance and isolated facility conveyance are used to increase the flexibility of the conveyance efficiency. The alternative has seven configurations from 3A to 3G.

Chart 1A and 1B show tables listing the components of the different configurations of each alternative. Chart 2 shows the physical components in a matrix format. Detailed alterrnative descriptions follow the charts.

CHART 1-A
COMPONENT CONFIGURATIONS A-D

	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
CONFIGURATION A	Re-Operation	North Delta Improvements 10,000 cfs Hood Intake South Delta Improvements	5,000 cfs Open Channel IF North Delta Improvements South Delta Improvements
CONFIGURATION B	Re-Operation CVP-SWP Improvements	North Delta Improvements 10,000 cfs Hood Intake South Delta Improvements CVP-SWP Improvements 3.0 MAF Upstream Sto. (Sac River Tribs.) 2.0 MAF Aqueduct Sto. 200 TAF In-Delta Sto. 500 TAF Groundwater Sto. (Sac Valley) 500 TAF Groundwater Sto. (San Joaquin Valley)	5,000 cfs Open Channel IF North Delta Improvements South Delta Improvements CVP-SWP Improvements 3.0 MAF Upstream Sto. (Sac River Tribs.) 500 TAF Upstream Sto. (San Joaquin Tribs.) 2.0 MAF Aqueduct Sto. 200 TAF In-Delta Sto. 500 TAF Groundwater Sto. (Sac Valley) 500 TAF Groundwater Sto. (San Joaquin Valley)
CONFIGURATION C	Re-Operation South Delta Improvements CVP-SWP Improvements 3.0 MAF Upstream Sto. (Sac River Tribs.) 1.0 MAF Aqueduct Sto. 500 TAF Groundwater Sto. (Sac Valley) 500 TAF Groundwater Sto. (San Joaquin Valley)	Western 15,000 cfs Isolated South Delta Intake Northern 15,000 cfs Isolated South Delta Intake Eastern 15,000 cfs Isolated South Delta Intake CVP-SWP Improvements	5,000 cfs Pipe IF North Delta Improvements South Delta Improvements
CONFIGURATION D	N/A	10,000 cfs Hood Intake Mokelumne River Floodway (East) East Delta Habitat South Delta Habitat CVP-SWP Improvements 2.0 MAF Aqueduct Sto.	5,000 cfs Pipe IF North Delta Improvements South Delta Improvements CVP-SWP Improvements 3.0 MAF Upstream Sto. (Sac River Tribs.) 2.0 MAF Aqueduct Sto. 200 TAF In-Delta Sto. 500 TAF Upstream Sto. (San Joaquin Tribs.) 500 TAF Groundwater Sto. (Sac Valley) 500 TAF Groundwater Sto. (San Joaquin Valley)

CHART 1-B
COMPONENT CONFIGURATIONS E-H

	ALT. 1	ALTERNATIVE 2	ALTERNATIVE 3
CONFIGURATION E	N/A	Tyler Island Habitat Mokelumne River Floodway (West) East Delta Habitat South Delta Habitat CVP-SWP Improvements 3.0 MAF Upstream Sto. (Sac River Tribs.) 500 TAF Upstream Sto. (San Joaquin Tribs.) 2.0 MAF Aqueduct Sto. 500 TAF Groundwater Sto. (Sac Valley) 500 TAF Groundwater Sto. (San Joaquin Valley)	15,000 cfs Open Channel IF North Delta Improvements CVP-SWP Improvements 3.0 MAF Upstream Sto. (Sac River Tribs.) 500 TAF Upstream Sto. (San Joaquin Tribs.) 2.0 MAF Aqueduct Sto. 200 TAF In-Delta Sto. 500 TAF Groundwater Sto. (Sac Valley) 500 TAF Groundwater Sto. (San Joaquin Valley)
CONFIGURATION F	N/A	N/A	Chain of Lakes North Delta Improvements CVP-SWP Improvements 3.0 MAF Upstream Sto. (Sac River Tribs.) 500 TAF Upstream Sto. (San Joaquin Tribs.) 2.0 MAF Aqueduct Sto. 500 TAF Groundwater Sto. (Sac Valley) 500 TAF Groundwater Sto. (San Joaquin Valley)
CONFIGURATION G	N/A	N/A	5,000 cfs Screened Deep Water Ship Channel and West Delta Tunnel North Delta Improvements CVP-SWP Improvements 3.0 MAF Upstream Sto. (Sac River Tribs.) 500 TAF Upstream Sto. (San Joaquin Tribs.) 2.0 MAF Aqueduct Sto. 200 TAF In-Delta Sto. 500 TAF Groundwater Sto. (Sac Valley) 500 TAF Groundwater Sto. (San Joaquin Valley)
CONFIGURATION H	N/A	N/A	5,000 cfs Open Channel IF Tyler Island Habitat Mokelumne River Floodway (West) East Delta Habitat South Delta Habitat CVP-SWP Improvements 3.0 MAF Upstream Sto. (Sac River Tribs.) 500 TAF Upstream Sto. (San Joaquin Tribs.) 2.0 MAF Aqueduct Sto. 500 TAF Groundwater Sto. (Sac Valley) 500 TAF Groundwater Sto. (San Joaquin Valley)

Groundwater Storage and Conjunctive Use Components

CALFED is committed to exploring opportunities for groundwater banking and in-lieu conjunctive use of groundwater resources. However, the potential for CALFED involvement in groundwater banking and in-lieu conjunctive use creates concerns for counties and for the local water agencies where the programs might be implemented. Although direct construction impacts are generally less than for surface storage facilities, there is a potential for affecting domestic well, farm operations, stream flow, habitat, towns and cities. In direct response to local concerns to this issue, the Program's first priority is to listen carefully to concerns and interests and look for opportunities where there is local interest, and the potential to combine local and statewide benefits. The second priority is to develop pilot programs which demonstrate that assurances can be established. The assurances must portect local interests while promoting common benefits to counties and local water agencies, hand-in-hand with system water supply reliability benefits. Therefore, although groundwater components are included in a number of alternative configurations, CALFED recognizes the ongoing need to coordinate closely with all affected parties in the alternative refinement process.

Linkages

CALFED staff has sought to incorporate a range of components broad enough to encompass the interests of CALFED agencies and stakeholders, without making any pre-determinations regarding preferred alternative configurations. At the same time, staff has given some consideration to linkages (i.e. potential benefits and impacts for a wide range of resource categories). Some of the key linkages are listed below, without regard to priority:

- Flood risk
- Water quality
- Water supply reliability
- Fisheries: First paradigm--Keep fish in the Sacramento River by screening diversions from the river
- Fisheries: Second paradigm-- Make the interior Delta more hospitable to anadromous fish by creating slow-moving cross-Delta flow with a large and diverse expanse of habitats
- Utilities: Pipelines, radio towers, gas wells, power lines, etc.
- Transportation: Highways and bridges
- Land use, agriculture, and wildlife habitat: First paradigm-- Minimize change in Delta configuration and loss of agricultural land from production. Preserve current agricultural land for its wildlife habitat value. Allow market forces and cooperative management agreements to dictate land use patterns.
- Land use, agriculture, and wildlife habitat: Second paradigm-- Seek extensive conversion of agricultural land to open water, shallow water habitat, riparian forest, wetlands, and dedicated wintering waterfowl habitat because it represents a net improvement in environmental quality. Recognize that current agricultural trends in Delta region include rapid loss of pasture and row crops to viticulture, decreasing concentrations of waste grain due to better harvesting techniques, and urbanization.
- Topography (Hills, land surface elevations, etc.)
- Geology: seismic risk, soils, foundation conditions, depth of peat

- *Sociological impacts*: Presence of cities, farms, and other infrastructure along facilities alignments. Compatibility with local land use plans (example: San Joaquin County plans for population growth on New Hope Tract)
- Recreation: Separation of recreationists from landowners, channel island destination sites, separation of fast and slow boat traffic, boat wakes, law enforcement
- Navigation: Preservation of navigation access for levee repair, commerce, and recreation
- Climatic effects: Wind waves, sea surface rise
- Seepage: Impacts on areas adjacent to flooded areas

Adaptive Management

The range of components described in the following pages offer various levels of flexibility in terms of incremental implementation and responding to changes in the Bay-Delta system and our understanding of it. Some physical and operational changes are readily implemented in small steps (i.e. creation of desirable habitats). Others, such as channel modifications for flood control, must be made with the total system response in mind, to prevent shifting a problem from one area to another. Adaptive management embodies these concepts, and should be kept in mind when refining components and alternative configurations. The reader may wish to ask:

- Is the component or alternative configuration amenable to incremental implementation?
- How easily can one backtrack or take a different approach if expected results do not occur?

Common Assumptions

In order to complete prefeasibility cost estimates with the appropriate level of effort, the following conceptual design assumptions are made:

- Levee slopes: 3:1 on land and water sides, unless otherwise noted
- On the water side of new setback levees it is assumed that a riparian berm of about 20-foot width, at +2 MSL, is provided.
- Water side slopes are protected against erosion by a layer of construction fabric and rip-rap, up to the 100-year flood design elevation, except for the water side berm horizontal surface, which is vegetated.
- Where new setback levees are constructed on unconsolidated peat, assume 50 % additional levee material is required to consolidate foundations
- For isolated open channel construction assume side slopes 1:8 to a depth of 3 feet below normal water surface elevation, then 1:3 side slopes to a maximum depth of 30 feet, 15 foot wide waterside berm, levees 1:3 side slopes, 20-foot crown width on levees.
- Wherever islands or tracts are permanently flooded, seepage interception wells are assumed to be required on adjacent islands or tracts to mitigate for increased seepage.
- Whenever existing levees are breached to create new channels and flooded areas it is assumed that they will remain in all areas except where the breaches are specified, to provide wave wash protection for adjacent islands, habitat areas, and recreation destination sites. The land side of the breached levees must be protected against erosion by using construction fabric and rip rap, up to 2 feet above mean high tide.

Alternative 1A

- Changes in Delta Operations

Alternative 1B

- Changes in Delta Operations
- CVP-SWP Improvements
  - Clifton Court Forebay
    - Construct new intake at northern end of Clifton Court
    - Construct new, state-of-the-art fish screens at the Skinner Fish Facility
    - Construct new gate
  - Tracy Pumping Plant
    - Construct interconnection with Clifton Court Forebay, with 2 sets of radial gates and 10,300 cfs capacity
    - Construct new, state-of-the-art fish screens at the Tracy Pumping Plant intake

Alternative 1C

- Changes in Delta Operations
- South Delta Improvements
  - Clifton Court Forebay Intake Structure
    - 220' x 60' x 28' concrete structure
    - Six steel radial gates 30' x 29'
    - 2,600 linear feet of new levee section from West Canal to CCFB
  - Channel Dredging Along a 4.9 mile Reach in Old River
    - Dredging of about 1.24 million cubic yards of material
    - Disposal of material
    - Berm creation with dried dredged material

- Old River Fish Control Structure

  - 415' x 35' concrete structure
  - Eight vertical lift gates 45' x 10'
  - Vertical gate storage area
  - Stationary crib crane
  - Docking facilities

- Middle River Flow Control Structure

  - Two 25' x 16' radial gates
  - Concrete bay structure
  - Boat ramps
  - Sheet pile wall
  - Permanent storage facility
  - Access road

- Grant Line Canal Flow Control Structure

  - Four 20' x 16' radial gates
  - Buried utility lines
  - Access road
  - Storage area
  - 50' x105' boating dock
  - 50' flashboard emergency access and microwave tower
  - Control building

- Old River Flow Control Structure

  - Three 20' x 15' radial gates
  - Concrete control structure
  - Steel sheet-pile wall
  - Channel dredging
  - Buried utility lines
  - Access road
  - Storage area
  - 50' x 105' boat lock
  - 1,000 feet of new levee
  - 50' flashboard emergency access and microwave tower
  - Control building

- CVP-SWP Improvements
  - Clifton Court Forebay
    - Construct new, state-of-the-art fish screens at the Skinner Fish Facility
  - Tracy Pumping Plant
    - Construct interconnection with Clifton Court Forebay, with 2 sets of radial gates and 10,300 cfs capacity
    - Construct new, state-of-the-art fish screens at the Tracy Pumping Plant intake

- 3.0 MAF Upstream Storage (Sacramento River Tributaries)
- 1.0 MAF Aqueduct Storage
- 500 TAF Groundwater Storage (Sacramento Valley)
- 500 TAF Groundwater Storage (San Joaquin Valley)

Alternative 2A

- North Delta Channel Improvement
  - New Hope Tract Setback Channel
    - Purchase 600 foot alignment along Mokelumne River, I-5 to New Hope Landing
    - Construct new setback levees from I-5 to New Hope Landing, set back 500 feet from existing channel
    - Relocate New Hope Landing and Wimpy's Marina to coincide with new setback levee
    - Remove existing levee sections where they would obstruct new channel, west and south levee sections
    - Construct new 500 foot bridge across setback channel, with sufficient elevation to allow small craft passage
    - Rebuild existing New Hope Tract levee, New Hope Landing to
    - Beaver Slough
    - Construct new, relocated irrigation diversions and drainage pumps for New Hope Tract
    - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion
  - North Mokelumne Setback Channel
    - Purchase 600 foot alignment along North Mokelumne River, New Hope Landing to south end of Tyler Island, alternating between Staten Island and Tyler Island sides as shown
    - Construct new setback levees along North Mokelumne River, New Hope Landing to south end of Tyler Island, alternating between Staten Island and Tyler Island sides as shown
    - Remove existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
    - Construct new 500 foot bridge, Thornton-Walnut Grove Road across setback channel, with sufficient elevation to allow small craft passage
    - Construct new, relocated irrigation diversions and drainage pumps for Staten Island and Tyler Island
    - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion

- Lower Mokelumne Setback Channel

  - Purchase 600 foot alignment along lower Mokelumne River on western portion of Bouldin Island
  - Construct new setback levees along lower Mokelumne River on western portion of Bouldin Island, approximately 500 feet east of existing levees, as shown
  - Excavate existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
  - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion
  - Construct new 500 foot bridge, Highway 12 crossing of lower Mokelumne River across setback channel, with sufficient elevation to allow small craft passage
  - Construct new, relocated irrigation diversions and drainage pumps for western portion of Bouldin Island

- 10,000 cfs Screened Hood Intake

  - Screen Intake

    - Relocation of Highway 160 and new bridge over diversion
    - Trashrack
    - Flood Gates or stop logs
    - Crane
    - Levees
    - Sedimentation Basin
    - Pumping Plant and discharge pipes to open channel
    - Fish Bypass System: Pump, Evaluation Facility, Return Pipe, Discharge Structure
    - Control Building, Parking, Access, Lighting, Fencing

  - Open Channel from Hood to Lambert Road

    - Acquire land along alignment, 2000-foot swath adjacent to SPRR
    - Open channel construction
    - Discharge structure, including at least 2 radial gates
    - Bridge, for Lambert Road
    - Upstream Migrant Passage Structure: Attraction, collection, and transport

- Glanville Tract Setback Channel

  - Acquire land along alignment, including leveed island in channel, and 2000-foot swath on southwest portion of Glanville Tract
  - Construct new setback levee, southwestern corner of Glanville Tract, 1000 feet east of existing alignment
  - Extend Twin Cities Road bridge. Assume elevated causeway 1000 feet long
  - Breach existing levees at north and south end of channel island west of Glanville Tract, to allow full 1000 foot width channel
  - Protect east slope of remaining west levee, which would become a channel island
  - Purchase or rebuild any gas wells which might be inundated by the new setback levee channel
  - Provide railroad trestle in future if State Museum excursion railroad plans are executed

- McCormack Williamson Tract Setback Channel

  - Acquire land along alignment, 600-foot swath
  - Remove east levee, 400 feet of north levee on western end of tract, remove 500 feet of south levee
  - Protect remaining interior levee slopes with rip-rap; remaining levees would become channel islands
  - Construct setback levee from northwest corner of Tract to tie in with proposed setback levee noted in item 3 of Delta Cross Channel Intake Option

- South Delta Improvements

  - Clifton Court Forebay Intake Structure

    - 220' x 60' x 28' concrete structure
    - Six steel radial gates 30' x 29'
    - 2,600 linear feet of new levee section from West Canal to CCFB

  - Channel Dredging Along a 4.9 mile Reach in Old River

    - Dredging of about 1.24 million cubic yards of material
    - Disposal of material
    - Berm creation with dried dredged material

- Old River Fish Control Structure

  - 415' x 35' concrete structure
  - Eight vertical lift gates 45' x 10'
  - Vertical gate storage area
  - Stationary crib crane
  - Docking facilities

- Middle River Flow Control Structure

  - Two 25' x 16' radial gates
  - Concrete bay structure
  - Boat ramps
  - Sheet pile wall
  - Permanent storage facility
  - Access road

- Grant Line Canal Flow Control Structure

  - Four 20' x 16' radial gates
  - Buried utility lines
  - Access road
  - Storage area
  - 50' x105' boating dock
  - 50' flashboard emergency access and microwave tower
  - Control building

- Old River Flow Control Structure

  - Three 20' x 15' radial gates
  - Concrete control structure
  - Steel sheet-pile wall
  - Channel dredging
  - Buried utility lines
  - Access road
  - Storage area
  - 50' x 105' boat lock
  - 1,000 feet of new levee
  - 50' flashboard emergency access and microwave tower
  - Control building

Alternative 2B

- North Delta Channel Improvement
  - New Hope Tract Setback Channel
    - Purchase 600 foot alignment along Mokelumne River, I-5 to New Hope Landing
    - Construct new setback levees from I-5 to New Hope Landing, set back 500 feet from existing channel
    - Relocate New Hope Landing and Wimpy's Marina to coincide with new setback levee
    - Remove existing levee sections where they would obstruct new channel, west and south levee sections
    - Construct new 500 foot bridge across setback channel, with sufficient elevation to allow small craft passage
    - Rebuild existing New Hope Tract levee, New Hope Landing to
    - Beaver Slough
    - Construct new, relocated irrigation diversions and drainage pumps for New Hope Tract
    - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion
  - North Mokelumne Setback Channel
    - Purchase 600 foot alignment along North Mokelumne River, New Hope Landing to south end of Tyler Island, alternating between Staten Island and Tyler Island sides as shown
    - Construct new setback levees along North Mokelumne River, New Hope Landing to south end of Tyler Island, alternating between Staten Island and Tyler Island sides as shown
    - Remove existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
    - Construct new 500 foot bridge, Thornton-Walnut Grove Road across setback channel, with sufficient elevation to allow small craft passage
    - Construct new, relocated irrigation diversions and drainage pumps for Staten Island and Tyler Island
    - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion

- Lower Mokelumne Setback Channel
  - Purchase 600 foot alignment along lower Mokelumne River on western portion of Bouldin Island
  - Construct new setback levees along lower Mokelumne River on western portion of Bouldin Island, approximately 500 feet east of existing levees, as shown
  - Excavate existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
  - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion
  - Construct new 500 foot bridge, Highway 12 crossing of lower Mokelumne River across setback channel, with sufficient elevation to allow small craft passage
  - Construct new, relocated irrigation diversions and drainage pumps for western portion of Bouldin Island

- 10,000 cfs Screened Hood Intake
  - Screen Intake
    - Relocation of Highway 160 and new bridge over diversion
    - Trashrack
    - Flood Gates or stop logs
    - Crane
    - Levees
    - Sedimentation Basin
    - Pumping Plant and discharge pipes to open channel
    - Fish Bypass System: Pump, Evaluation Facility, Return Pipe, Discharge Structure
    - Control Building, Parking, Access, Lighting, Fencing
  - Open Channel from Hood to Lambert Road
    - Acquire land along alignment, 2000-foot swath adjacent to SPRR
    - Open channel construction
    - Discharge structure, including at least 2 radial gates
    - Bridge, for Lambert Road
    - Upstream Migrant Passage Structure: Attraction, collection, and transport

- Glanville Tract Setback Channel

  - Acquire land along alignment, including leveed island in channel, and 2000-foot swath on southwest portion of Glanville Tract
  - Construct new setback levee, southwestern corner of Glanville Tract, 1000 feet east of existing alignment
  - Extend Twin Cities Road bridge. Assume elevated causeway 1000 feet long
  - Breach existing levees at north and south end of channel island west of Glanville Tract, to allow full 1000 foot width channel
  - Protect east slope of remaining west levee, which would become a channel island
  - Purchase or rebuild any gas wells which might be inundated by the new setback levee channel
  - Provide railroad trestle in future if State Museum excursion railroad plans are executed

- McCormack Williamson Track Setback Channel

  - Acquire land along alignment, 600-foot swath
  - Remove east levee, 400 feet of north levee on western end of tract, remove 500 feet of south levee
  - Protect remaining interior levee slopes with rip-rap; remaining levees would become channel islands
  - Construct setback levee from northwest corner of Tract to tie in with proposed setback levee noted in item 3 of Delta Cross Channel Intake Option

- South Delta Improvements

  - Clifton Court Forebay Intake Structure

    - 220' x 60' x 28' concrete structure
    - Six steel radial gates 30' x 29'
    - 2,600 linear feet of new levee section from West Canal to CCFB

  - Channel Dredging Along a 4.9 mile Reach in Old River

    - Dredging of about 1.24 million cubic yards of material
    - Disposal of material
    - Berm creation with dried dredged material

- Old River Fish Control Structure

  - 415' x 35' concrete structure
  - Eight vertical lift gates 45' x 10'
  - Vertical gate storage area
  - Stationary crib crane
  - Docking facilities

- Middle River Flow Control Structure

  - Two 25' x 16' radial gates
  - Concrete bay structure
  - Boat ramps
  - Sheet pile wall
  - Permanent storage facility
  - Access road

- Grant Line Canal Flow Control Structure

  - Four 20' x 16' radial gates
  - Buried utility lines
  - Access road
  - Storage area
  - 50' x105' boating dock
  - 50' flashboard emergency access and microwave tower
  - Control building

- Old River Flow Control Structure

  - Three 20' x 15' radial gates
  - Concrete control structure
  - Steel sheet-pile wall
  - Channel dredging
  - Buried utility lines
  - Access road
  - Storage area
  - 50' x 105' boat lock
  - 1,000 feet of new levee
  - 50' flashboard emergency access and microwave tower
  - Control building

- CVP-SWP Improvements
  - Clifton Court Forebay
    - Construct new, state-of-the-art fish screens at the Skinner Fish Facility
  - Tracy Pumping Plant
    - Construct interconnection with Clifton Court Forebay, with 2 sets of radial gates and 10,300 cfs capacity
    - Construct new, state-of-the-art fish screens at the Tracy Pumping Plant intake
- 3.0 MAF Upstream (Sacramento River Tributaries) Storage
- 2.0 MAF Aqueduct Storage
- 200 TAF In-Delta Storage
- 500 TAF Groundwater Storage (Sacramento Valley)
- 500 TAF Groundwater Storage (San Joaquin Valley)

Alternative 2C

- Western 15,000 cfs Isolated South Delta Intake
  - Palm Tract Intake and Isolated Conveyance
    - Purchase 1000-foot alignment on eastern portion of Palm Tract
    - Gated entrance on northeast corner of Palm Tract, on Rock Slough
    - Siphon under Mokelumne River Aqueduct and railroad
    - Construct setback levee parallel with Old river, set back about 500 feet to the west
    - Construct new, relocated irrigation diversions and drainage pumps
    - Place rip-rap on existing interior levee slopes of new conveyance channel, particularly west side of Old River levee, which becomes the east bank of conveyance channel
  - Orwood Tract Isolated Channel
    - Purchase 1000-foot alignment on eastern portion of Orwood Tract
    - Construct setback levee parallel with Old river, set back about 500 feet to the west
    - Construct new, relocated irrigation diversions and drainage pumps
    - Siphon under Indian Slough
    - Place rip-rap on existing interior levee slopes of new conveyance channel, particularly west side of Old River levee, which becomes the east bank of conveyance channel
  - Byron Tract Isolated Channel
    - Purchase 1000-foot alignment on eastern portion of Byron Tract north of Highway 4
    - Construct setback levee parallel with Old river, set back about 500 feet to the west
    - Construct new, relocated irrigation diversions and drainage pumps
    - Construct new 500-foot causeway over new setback channel and new bridge and alignment over Old River for Highway 4
    - Siphon under Old River to Victoria Island
    - Place rip-rap on existing interior levee slopes of new conveyance channel, particularly west side of Old River levee, which becomes the east bank of conveyance channel

- Victoria Island Isolated Channel

  - Purchase 1000-foot alignment on western portion of Victoria Island south of Highway 4
  - Construct setback levee parallel with Old river, set back about 500 feet to the east
  - Construct new, relocated irrigation diversions and drainage pumps alignment over Old River for Highway 4
  - Siphon under Old River to Victoria Island
  - Place rip-rap on existing interior levee slopes of new conveyance channel, particularly west side of Old River levee, which becomes the east bank of conveyance channel

- Northern 15,000 cfs Isolated South Delta Intake

  - Lower Roberts Island Intake and Isolated Conveyance

    - Acquire land along alignment, 2000-foot swath
    - Gated intake structure
    - <<< May require low lift pumps >>>
    - Open channel construction
    - McDonald Road Bridge
    - Atchison Topeka RR bridge
    - Relocation, Mokelumne River Aqueduct
    - Holt Road bridge
    - Holt Community relocations (note: check aerial photography; a slight relocation of alignment can miss this community)
    - Highway 4 bridge
    - Kingston School Road bridge
    - Siphon under Middle River
    - Check structures as required

  - Open Channel, Union Island

    - Acquire land along alignment, 2000-foot swath
    - Open channel construction
    - Bonetti Road bridge
    - Siphon under Old River
    - Check structures as required

  - Open Channel, Coney Island
    - Acquire land along alignment, 2000-foot swath
    - Open channel construction
    - Siphon under West Canal

- Eastern 15,000 cfs Isolated South Delta Intake
  - Upper Roberts Island Intake and Isolated Conveyance
    - Acquire land along alignment, 2000-foot swath
    - Gated intake structure, San Joaquin River at latitude of Undine Road
    - <<< May require low lift pumps >>>
    - Open channel construction
    - Roberts Road Bridge
    - Crocker Road Bridge
    - Relocation/Utility crossing: High voltage electric transmission overhead cables
    - Siphon under Middle River
    - Check structures as required
  - Open Channel, Union Island
    - Acquire land along alignment, 2000-foot swath
    - Open channel construction. Where new channel is adjacent to existing levee (i.e. Grant Line Canal), it is assumed that existing levee interior slope will be rip-rapped and strengthened as required.
    - Wing Levee Road bridge
    - Undine Road bridge
    - Tracy Blvd. bridge
    - Bonetti Road bridge
    - Siphon under Old River
    - Check structures as required
  - Open Channel, Clifton Court
    - Open channel construction
    - Gate at Clifton Court Forebay
- CVP-SWP Improvements
  - Clifton Court Forebay
    - Construct new intake at northern end of Clifton Court
    - Construct new, state-of-the-art fish screens at the Skinner Fish Facility
  - Tracy Pumping Plant
    - Construct interconnection with Clifton Court Forebay, with 2 sets of radial gates and 10,300 cfs capacity
    - Construct new, state-of-the-art fish screens at the Tracy Pumping Plant intake

Alternative 2D

- 10,000 cfs Screened Hood Intake
  - Screen Intake
    - Relocation of Highway 160 and new bridge over diversion
    - Trashrack
    - Flood Gates or stop logs
    - Crane
    - Levees
    - Sedimentation Basin
    - Pumping Plant and discharge pipes to open channel
    - Fish Bypass System: Pump, Evaluation Facility, Return Pipe, Discharge Structure
    - Control Building, Parking, Access, Lighting, Fencing
  - Open Channel from Hood to Lambert Road
    - Acquire land along alignment, 2000-foot swath adjacent to SPRR
    - Open channel construction
    - Discharge structure, including at least 2 radial gates
    - Bridge, for Lambert Road
    - Upstream Migrant Passage Structure: Attraction, collection, and transport
  - Glanville Tract Setback Channel
    - Acquire land along alignment, including leveed island in channel, and 2000-foot swath on southwest portion of Glanville Tract
    - Construct new setback levee, southwestern corner of Glanville Tract, 1000 feet east of existing alignment
    - Extend Twin Cities Road bridge. Assume elevated causeway 1000 feet long
    - Breach existing levees at north and south end of channel island west of Glanville Tract, to allow full 1000 foot width channel
    - Protect east slope of remaining west levee, which would become a channel island
    - Purchase or rebuild any gas wells which might be inundated by the new setback levee channel
    - Provide railroad trestle in future if State Museum excursion railroad plans are executed

- Mokelumne River Floodway (East)

  - McCormack-Williamson Tract Floodway and Habitat

    - Purchase McCormack-Williamson Tract
    - Excavate levee on northeast end, near I-5, 2000-foot width
    - Excavate levee on southwest , adjacent to Dead Horse Cut, 2000-foot width (Don't rip-rap interior slopes, due to general elevation above sea level)
    - Build bridge and secure access road to radio tower control building

  - New Hope Tract Setback Channel (Habitat Emphasis)

    - Purchase western half of New Hope Tract for habitat creation
    - Construct new setback levees north to south from Mokelumne River to Beaver Slough, 2000 feet east of existing alignment
    - Relocate New Hope Landing and Wimpy's Marina to coincide with new setback levee
    - Remove existing levee sections where they would obstruct new channel, west and south levee sections
    - Construct new 2000 foot bridge across setback channel, with sufficient elevation to allow small craft passage
    - Rebuild existing New Hope Tract levee, from Mokelumne River at I-5 crossing to junction with setback levee on northwest side of levee
    - Construct new, relocated irrigation diversions and drainage pumps for New Hope Tract
    - Construct seepage interception wells along Beaver Slough levee
    - Reinforce Beaver Slough levee
    - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion

  - Terminous Tract Setback Channel

    - Purchase 2000-foot wide section at northwest corner of Terminous Tract
    - Remove 2000-foot sections of levee at west end of Sycamore Slough and on the east bank of the South Mokelumne River to create flow path
    - Construct new setback levees north to south from Sycamore Slough to South Mokelumne River, 2000 feet east of existing alignment
    - Protect east slope of remaining west levee along the South Mokelumne River, which would become a channel island
    - Reinforce existing levee along Sycamore Slough
    - Place seepage interception wells along Sycamore Slough levee, South Mokelumne levee, and Little Potato Slough levee
    - Construct new, relocated irrigation diversions and drainage pumps

- Staten Island Setback Channel

  - Purchase 4000-foot wide section at the southeast corner of Staten Island
  - Remove 4000-foot sections of levee along west bank of South Mokelumne River north of Terminous and on north bank west of Terminous to create flow path
  - Construct new setback levee north to south to cut off southeast corner of Staten Island creating 4000-foot wide channel
  - Protect west slope of remaining levee along the South Mokelumne River with rip-rap; this levee would become a channel island
  - Place seepage interception wells along South Mokelumne River

- Bouldin Island Aquatic Habitat

  - Purchase Bouldin Island
  - Remove 4000-foot section of levee, south bank of South Mokelumne River, just west of Terminous.
  - Remove 4000-foot section of levee along San Joaquin River, between Potato Slough and Mokelumne River
  - Protect remaining interior levee slopes of island with rip-rap; these would become channel islands and help protect adjacent islands against wave wash
  - construct 3 miles of elevated embankment roadway for Highway 12, beginning at the Terminous Bridge access ramp. Protect both north and south sides with rip-rap.
  - Construct 2,000-foot bridge in near east end of Bouldin Island to facilitate flood and transfer flows to move from South Mokelumne River to San Joaquin River
  - Construct seepage interception wells along channels adjacent to Bouldin Island including Brannan-Andrus Island, Venice Island, Empire Tract, Terminous Tract and Staten Island

- East Delta Habitat

  - Canal Ranch Tract Wetlands

    - Purchase Canal Ranch Tract
    - Remove 2000-foot sections of levee at west end of Beaver Slough and Hog Slough
    - Protect remaining interior levee slopes with rip-rap; remaining levees would become channel islands, and would help protect adjacent tracts from wave wash
    - Relocate gas pipelines and other utilities as required

  - Brack Tract Wetlands

    - Purchase Brack Tract
    - Remove 2000-foot sections of levee at west end of Hog Slough and Sycamore Slough
    - Protect remaining interior levee slopes with rip-rap. Remaining levees would become channel islands, and would help protect adjacent tracts from wave wash
    - Relocate gas pipelines and other utilities as required

❖ South Delta Habitat

➢ Palm Tract

- Purchase 3000-foot alignment on eastern portion of Palm Tract
- Remove 3000 feet of levee on Rock Slough from Old River westward
- Remove 3000 feet of levee on southeast corner of tract from Old River westward
- Construct setback levee parallel with Old river, set back about 3000 feet to the west
- Construct new, relocated irrigation diversions and drainage pumps
- Place rip-rap on west side of Old River levee, which becomes a channel island

➢ Orwood Tract

- Purchase 3000-foot alignment on eastern portion of Orwood Tract
- Remove 3000 feet of levee on northeast corner from Old River westward
- Remove 3000 feet of levee on Indian Slough from Old River westward
- Construct setback levee parallel with Old river, set back about 3000 feet to the west
- Construct new, relocated irrigation diversions and drainage pumps
- Place rip-rap on west side of Old River levee, which becomes a channel island
- Construct ring levee around Mokelumne River Aqueduct

➢ Byron Tract

- Purchase 3000-foot alignment on eastern portion of Byron Tract, north of Highway 4
- Remove 1000-feet of levee on Indian Slough from Old River westward
- Remove 1000-feet of levee along Old River north of Highway 4
- Construct setback levee parallel with Old river, set back about 3000 feet to the west as far south as Highway 4
- Construct new, relocated irrigation diversions and drainage pumps
- Place rip-rap on west side of Old River levee, which becomes a channel island
- Construct new 3000-foot embankment causeway over new setback channel and new bridge and alignment over Old River for Highway 4

➢ Victoria Island

- Purchase 3000-foot alignment on western portion of Victoria Island south of Highway 4
- Remove 1000 feet of levee on Old River, south of Highway 4
- Remove 1000 feet of levee along Old River near Clifton Court Forebay
- Construct setback levee parallel with Old river, set back about 3000 feet to the west as far south as Clifton Court Forebay
- Construct new, relocated irrigation diversions and drainage pumps
- Place rip-rap on east side of Old River levee, which becomes a channel island

- CVP-SWP Improvements
  - Clifton Court Forebay
    - Construct new intake at northern end of Clifton Court
    - Construct new, state-of-the-art fish screens at the Skinner Fish Facility
  - Tracy Pumping Plant
    - Construct interconnection with Clifton Court Forebay, with 2 sets of radial gates and 10,300 cfs capacity
    - Construct new, state-of-the-art fish screens at the Tracy Pumping Plant intake
- 2.0 MAF Aqueduct Storage

Alternative 2E

- Tyler Island Habitat
  - Andrus Island Setback Channel
    - Purchase Alignment, northeast corner of Andrus Island
    - Construct setback levee, 500 feet west of Georgiana Slough, from Sacramento River to weir intake as shown
    - Excavate existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
    - Construct new 500 foot bridge and elevated roadway from Georgiana Slough swing bridge to junction with existing Isleton Road, with sufficient elevation to allow small craft passage
    - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion
  - Tyler Island Aquatic Habitat
    - Construct 600-foot wide North Weir in levee near northwest section of Tyler Island, with inflatable rubber dam to control weir elevation
    - Construct bridge across North Weir apron for maintenance access and access to levee road
    - Construct channel section control in Georgiana Slough to prevent accelerated erosion of channel bottom; armoring with rip-rap or gabion baskets across entire section, for 100 feet
    - Place rip-rap along interior levee slopes of remaining levees around island to protect against wave wash. Georgiana Slough levee must remain intact to maintain flood flow distribution
    - Breach 2000 feet of levee on northeast side of island
    - Construct new levee from North Weir to breach of levee on northeast side of island
    - Construct bridge over new flood channel created by northeast levee breach for Thornton-Walnut Grove Road
- Mokelumne River Floodway (West)
  - McCormack-Williamson Tract Floodway and Habitat
    - Purchase McCormack-Williamson Tract
    - Excavate levee on northeast end, near I-5, 2000-foot width
    - Excavate levee on southwest , adjacent to Dead Horse Cut, 2000-foot width (Don't rip-rap interior slopes, due to general elevation above sea level)
    - Build bridge and secure access road to radio tower control building

➢ Dead Horse Island Floodway and Habitat

- Purchase Dead Horse Island (200 ac) including 1 residence
- Excavate levee on southwest side of Dead Horse Island, 2000-foot width
- Excavate levee on northeast side of Dead Horse Island (adjacent to Dead Horse Cut), 2000-foot width
- Place erosion control rip-rap on remaining interior levee slopes

➢ Bouldin Island

- Purchase Bouldin Island
- Remove 2000-foot section of levee, east bank lower Mokelumne, north of Highway 12
- Remove 3000-foot section of levee along San Joaquin River between Potato Slough and Mokelumne River
- Protect remaining interior levee slopes of island with rip-rap; these would become channel islands and help protect adjacent islands against wave wash
- Construct elevated embankment roadway across Bouldin Island, except for new bridge; protect both north and south sides with rip-rap.
- Construct 2,000-foot bridge at west end of Bouldin Island to facilitate flood and transfer flows to move to San Joaquin River
- Construct seepage interception wells along channels adjacent to Bouldin Island including Brannan-Andrus Island, Venice Island, Empire Tract, Terminous Tract and Staten Island

❖ East Delta Habitat

➢ Canal Ranch Tract Wetlands

- Purchase Canal Ranch Tract
- Remove 2000-foot sections of levee at west end of Beaver Slough and Hog Slough
- Protect remaining interior levee slopes with rip-rap; remaining levees would become channel islands, and would help protect adjacent tracts from wave wash
- Relocate gas pipelines and other utilities as required

➢ Brack Tract Wetlands

- Purchase Brack Tract
- Remove 2000-foot sections of levee at west end of Hog Slough and Sycamore Slough
- Protect remaining interior levee slopes with rip-rap. Remaining levees would become channel islands, and would help protect adjacent tracts from wave wash
- Relocate gas pipelines and other utilities as required

- South Delta Habitat
  - Palm Tract
    - Purchase 3000-foot alignment on eastern portion of Palm Tract
    - Remove 3000 feet of levee on Rock Slough from Old River westward
    - Remove 3000 feet of levee on southeast corner of tract from Old River westward
    - Construct setback levee parallel with Old river, set back about 3000 feet to the west
    - Construct new, relocated irrigation diversions and drainage pumps
    - Place rip-rap on west side of Old River levee, which becomes a channel island
  - Orwood Tract
    - Purchase 3000-foot alignment on eastern portion of Orwood Tract
    - Remove 3000 feet of levee on northeast corner from Old River westward
    - Remove 3000 feet of levee on Indian Slough from Old River westward
    - Construct setback levee parallel with Old river, set back about 3000 feet to the west
    - Construct new, relocated irrigation diversions and drainage pumps
    - Place rip-rap on west side of Old River levee, which becomes a channel island
    - Construct ring levee around Mokelumne River Aqueduct
  - Byron Tract
    - Purchase 3000-foot alignment on eastern portion of Byron Tract, north of Highway 4
    - Remove 1000-feet of levee on Indian Slough from Old River westward
    - Remove 1000-feet of levee along Old River north of Highway 4
    - Construct setback levee parallel with Old river, set back about 3000 feet to the west as far south as Highway 4
    - Construct new, relocated irrigation diversions and drainage pumps
    - Place rip-rap on west side of Old River levee, which becomes a channel island
    - Construct new 3000-foot embankment causeway over new setback channel and new bridge and alignment over Old River for Highway 4
  - Victoria Island
    - Purchase 3000-foot alignment on western portion of Victoria Island south of Highway 4
    - Remove 1000 feet of levee on Old River, south of Highway 4
    - Remove 1000 feet of levee along Old River near Clifton Court Forebay
    - Construct setback levee parallel with Old river, set back about 3000 feet to the west as far south as Clifton Court Forebay
    - Construct new, relocated irrigation diversions and drainage pumps
    - Place rip-rap on east side of Old River levee, which becomes a channel island

- CVP-SWP Improvements
  - Clifton Court Forebay
    - Construct new intake at northern end of Clifton Court
    - Construct new, state-of-the-art fish screens at the Skinner Fish Facility
  - Tracy Pumping Plant
    - Construct interconnection with Clifton Court Forebay, with 2 sets of radial gates and 10,300 cfs capacity
    - Construct new, state-of-the-art fish screens at the Tracy Pumping Plant intake
- 3.0 MAF Upstream Storage (Sacramento River Tributaries)
- 500 TAF Upstream Storage (San Joaquin River Tributaries)
- 2.0 MAF Aqueduct Storage
- 500 TAF Groundwater Storage (Sacramento Valley)
- 500 TAF Groundwater Storage (San Joaquin Valley)

Alternative 3A

- 5,000 cfs Open Channel Isolated Facility
  - Screened Intake at Hood: Offstream folded "V"
    - Relocation of Highway 160 and new bridge over diversion
    - Trashrack
    - Flood Gates or stop logs
    - Crane
    - Levees
    - Sedimentation Basin
    - Pumping Plant and discharge pipes over levee
    - Fish Bypass System: Pump, Evaluation Facility, Return Pipe, Discharge Structure
    - Control Building, Parking, Access, Lighting, Fencing
  - Alternate Intake at Babel Slough (River Mile 30)
    - Relocation of South River Road and new bridge over diversion
    - Trashrack
    - Flood Gates or stop logs
    - Crane
    - Levees
    - Sedimentation Basin
    - Pumping Plant and discharge to open channel
    - Fish Bypass System: Pump, Evaluation Facility, Return Pipe, Discharge Structure
    - Control Building, Parking, Access, Lighting, Fencing
    - Open channel southeast Sacramento River at RM 25
    - Siphon under Sacramento River
    - Open channel south to Hood
    - Bridge, Hood-Franklin Road
  - Open Channel, Hood to Lambert Road along west side of SPRR embankment
    - Acquire land along alignment, 2000-foot swath
    - Open channel construction
    - Siphon under Snodgrass Slough
  - Open Channel, Glanville Tract
    - Acquire land along alignment, 2000-foot swath, include existing borrow pits 1-4
    - Open channel construction
    - Siphon under Mokelumne River floodway
    - Check structures as required

- Open Channel, New Hope Tract

  - Acquire land along alignment, 2000-foot swath, include existing borrow pit 5
  - Open channel construction
  - Barber Road bridge
  - Thornton-Walnut Grove bridge
  - Siphon under Beaver Slough
  - Check structures as required

- Open Channel, Canal Ranch

  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - Siphon under Hog Slough
  - Check structures as required

- Open Channel, Brack Tract

  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - Woodbridge Road bridge
  - Siphon under Sycamore Slough
  - Check structures as required

- Open Channel, Terminous Tract

  - Acquire land along alignment, 2000-foot swath, include existing borrow pits
  - Open channel construction
  - Highway 12 bridge
  - Check structures as required

- Open Channel, Shin Kee Tract

  - Acquire land along alignment, 2000-foot swath, include existing borrow pits 9-12
  - White Slough local drainage structures
  - Open channel construction
  - Check structures as required

- Open Channel, Rio Blanco Tract

  - Acquire land along alignment, 2000-foot swath, include existing borrow pit 13
  - Open channel construction
  - Telephone Cut, Relocate pumping station and cut off easterly end of Telephone Cut
  - Check structures as required

- Open Channel, Bishop Tract

  - Acquire land along NEW alignment, 2000-foot swath as shown
  - Open channel construction
  - Eightmile Road bridge
  - Siphon under Disappointment Slough
  - Check structures as required

- Open Channel, Rindge Tract

  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - Siphon under San Joaquin River
  - Check structures as required

- Open Channel, Roberts Island

  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - House Road bridge
  - Relocation, Mokelumne River Aqueduct
  - Jacobs Road bridge
  - Inland Road bridge
  - Atchison Topeka RR bridge
  - Highway 4 bridge
  - Kingston School Road bridge
  - Siphon under Middle River
  - Check structures as required

- Open Channel, Union Island

  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - Bonetti Road bridge
  - Siphon under Old River
  - Check structures as required

- Open Channel, Coney Island

  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - Siphon under West Canal

- Tracy Pumping Plant

  - Construct interconnection with Clifton Court Forebay, with 2 sets of radial gates and 10,300 cfs capacity
  - Construct new, state-of-the-art fish screens at the Tracy Pumping Plant intake (for 5,000 cfs and 10,000 cfs Components)

❖ North Delta Channel Improvement

➢ New Hope Tract Setback Channel

- Purchase 600 foot alignment along Mokelumne River, I-5 to New Hope Landing
- Construct new setback levees from I-5 to New Hope Landing, set back 500 feet from existing channel
- Relocate New Hope Landing and Wimpy's Marina to coincide with new setback levee
- Remove existing levee sections where they would obstruct new channel, west and south levee sections
- Construct new 500 foot bridge across setback channel, with sufficient elevation to allow small craft passage
- Rebuild existing New Hope Tract levee, New Hope Landing to
- Beaver Slough
- Construct new, relocated irrigation diversions and drainage pumps for New Hope Tract
- Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion

➢ North Mokelumne Setback Channel

- Purchase 600 foot alignment along North Mokelumne River, New Hope Landing to south end of Tyler Island, alternating between Staten Island and Tyler Island sides as shown
- Construct new setback levees along North Mokelumne River, New Hope Landing to south end of Tyler Island, alternating between Staten Island and Tyler Island sides as shown
- Remove existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
- Construct new 500 foot bridge, Thornton-Walnut Grove Road across setback channel, with sufficient elevation to allow small craft passage
- Construct new, relocated irrigation diversions and drainage pumps for Staten Island and Tyler Island
- Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion

- Lower Mokelumne Setback Channel
  - Purchase 600 foot alignment along lower Mokelumne River on western portion of Bouldin Island
  - Construct new setback levees along lower Mokelumne River on western portion of Bouldin Island, approximately 500 feet east of existing levees, as shown
  - Excavate existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
  - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion
  - Construct new 500 foot bridge, Highway 12 crossing of lower Mokelumne River across setback channel, with sufficient elevation to allow small craft passage
  - Construct new, relocated irrigation diversions and drainage pumps for western portion of Bouldin Island

- South Delta Improvements
  - Clifton Court Forebay Intake Structure
    - 220' x 60' x 28' concrete structure
    - Six steel radial gates 30' x 29'
    - 2,600 linear feet of new levee section from West Canal to CCFB
  - Channel Dredging Along a 4.9 mile Reach in Old River
    - Dredging of about 1.24 million cubic yards of material
    - Disposal of material
    - Berm creation with dried dredged material
  - Old River Fish Control Structure
    - 415' x 35' concrete structure
    - Eight vertical lift gates 45' x 10'
    - Vertical gate storage area
    - Stationary crib crane
    - Docking facilities
  - Middle River Flow Control Structure
    - Two 25' x 16' radial gates
    - Concrete bay structure
    - Boat ramps
    - Sheet pile wall
    - Permanent storage facility
    - Access road

➢ Grant Line Canal Flow Control Structure

- Four 20' x 16' radial gates
- Buried utility lines
- Access road
- Storage area
- 50' x105' boating dock
- 50' flashboard emergency access and microwave tower
- Control building

➢ Old River Flow Control Structure

- Three 20' x 15' radial gates
- Concrete control structure
- Steel sheet-pile wall
- Channel dredging
- Buried utility lines
- Access road
- Storage area
- 50' x 105' boat lock
- 1,000 feet of new levee
- 50' flashboard emergency access and microwave tower
- Control building

Alternative 3B

- 5,000 cfs Open Channel Isolated Facility
  - Screened Intake at Hood: Offstream folded "V"
    - Relocation of Highway 160 and new bridge over diversion
    - Trashrack
    - Flood Gates or stop logs
    - Crane
    - Levees
    - Sedimentation Basin
    - Pumping Plant and discharge pipes over levee
    - Fish Bypass System: Pump, Evaluation Facility, Return Pipe, Discharge Structure
    - Control Building, Parking, Access, Lighting, Fencing
  - Alternate Intake at Babel Slough (River Mile 30)
    - Relocation of South River Road and new bridge over diversion
    - Trashrack
    - Flood Gates or stop logs
    - Crane
    - Levees
    - Sedimentation Basin
    - Pumping Plant and discharge to open channel
    - Fish Bypass System: Pump, Evaluation Facility, Return Pipe, Discharge Structure
    - Control Building, Parking, Access, Lighting, Fencing
    - Open channel southeast Sacramento River at RM 25
    - Siphon under Sacramento River
    - Open channel south to Hood
    - Bridge, Hood-Franklin Road
  - Open Channel, Hood to Lambert Road along west side of SPRR embankment
    - Acquire land along alignment, 2000-foot swath
    - Open channel construction
    - Siphon under Snodgrass Slough
  - Open Channel, Glanville Tract
    - Acquire land along alignment, 2000-foot swath, include existing borrow pits 1-4
    - Open channel construction
    - Siphon under Mokelumne River floodway
    - Check structures as required

- Open Channel, New Hope Tract

  - Acquire land along alignment, 2000-foot swath, include existing borrow pit 5
  - Open channel construction
  - Barber Road bridge
  - Thornton-Walnut Grove bridge
  - Siphon under Beaver Slough
  - Check structures as required

- Open Channel, Canal Ranch

  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - Siphon under Hog Slough
  - Check structures as required

- Open Channel, Brack Tract

  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - Woodbridge Road bridge
  - Siphon under Sycamore Slough
  - Check structures as required

- Open Channel, Terminous Tract

  - Acquire land along alignment, 2000-foot swath, include existing borrow pits
  - Open channel construction
  - Highway 12 bridge
  - Check structures as required

- Open Channel, Shin Kee Tract

  - Acquire land along alignment, 2000-foot swath, include existing borrow pits 9-12
  - White Slough local drainage structures
  - Open channel construction
  - Check structures as required

- Open Channel, Rio Blanco Tract

  - Acquire land along alignment, 2000-foot swath, include existing borrow pit 13
  - Open channel construction
  - Telephone Cut, Relocate pumping station and cut off easterly end of Telephone Cut
  - Check structures as required

- Open Channel, Bishop Tract
  - Acquire land along NEW alignment, 2000-foot swath as shown
  - Open channel construction
  - Eightmile Road bridge
  - Siphon under Disappointment Slough
  - Check structures as required
- Open Channel, Rindge Tract
  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - Siphon under San Joaquin River
  - Check structures as required
- Open Channel, Roberts Island
  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - House Road bridge
  - Relocation, Mokelumne River Aqueduct
  - Jacobs Road bridge
  - Inland Road bridge
  - Atchison Topeka RR bridge
  - Highway 4 bridge
  - Kingston School Road bridge
  - Siphon under Middle River
  - Check structures as required
- Open Channel, Union Island
  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - Bonetti Road bridge
  - Siphon under Old River
  - Check structures as required
- Open Channel, Coney Island
  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - Siphon under West Canal

❖ North Delta Channel Improvement

➢ New Hope Tract Setback Channel

- Purchase 600 foot alignment along Mokelumne River, I-5 to New Hope Landing
- Construct new setback levees from I-5 to New Hope Landing, set back 500 feet from existing channel
- Relocate New Hope Landing and Wimpy's Marina to coincide with new setback levee
- Remove existing levee sections where they would obstruct new channel, west and south levee sections
- Construct new 500 foot bridge across setback channel, with sufficient elevation to allow small craft passage
- Rebuild existing New Hope Tract levee, New Hope Landing to
- Beaver Slough
- Construct new, relocated irrigation diversions and drainage pumps for New Hope Tract
- Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion

➢ North Mokelumne Setback Channel

- Purchase 600 foot alignment along North Mokelumne River, New Hope Landing to south end of Tyler Island, alternating between Staten Island and Tyler Island sides as shown
- Construct new setback levees along North Mokelumne River, New Hope Landing to south end of Tyler Island, alternating between Staten Island and Tyler Island sides as shown
- Remove existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
- Construct new 500 foot bridge, Thornton-Walnut Grove Road across setback channel, with sufficient elevation to allow small craft passage
- Construct new, relocated irrigation diversions and drainage pumps for Staten Island and Tyler Island
- Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion

- Lower Mokelumne Setback Channel
  - Purchase 600 foot alignment along lower Mokelumne River on western portion of Bouldin Island
  - Construct new setback levees along lower Mokelumne River on western portion of Bouldin Island, approximately 500 feet east of existing levees, as shown
  - Excavate existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
  - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion
  - Construct new 500 foot bridge, Highway 12 crossing of lower Mokelumne River across setback channel, with sufficient elevation to allow small craft passage
  - Construct new, relocated irrigation diversions and drainage pumps for western portion of Bouldin Island

- South Delta Improvements
  - Clifton Court Forebay Intake Structure
    - 220' x 60' x 28' concrete structure
    - Six steel radial gates 30' x 29'
    - 2,600 linear feet of new levee section from West Canal to CCFB
  - Channel Dredging Along a 4.9 mile Reach in Old River
    - Dredging of about 1.24 million cubic yards of material
    - Disposal of material
    - Berm creation with dried dredged material
  - Old River Fish Control Structure
    - 415' x 35' concrete structure
    - Eight vertical lift gates 45' x 10'
    - Vertical gate storage area
    - Stationary crib crane
    - Docking facilities
  - Middle River Flow Control Structure
    - Two 25' x 16' radial gates
    - Concrete bay structure
    - Boat ramps
    - Sheet pile wall
    - Permanent storage facility
    - Access road

- Grant Line Canal Flow Control Structure
  - Four 20' x 16' radial gates
  - Buried utility lines
  - Access road
  - Storage area
  - 50' x105' boating dock
  - 50' flashboard emergency access and microwave tower
  - Control building

- Old River Flow Control Structure
  - Three 20' x 15' radial gates
  - Concrete control structure
  - Steel sheet-pile wall
  - Channel dredging
  - Buried utility lines
  - Access road
  - Storage area
  - 50' x 105' boat lock
  - 1,000 feet of new levee
  - 50' flashboard emergency access and microwave tower
  - Control building

- CVP-SWP Improvements
  - Clifton Court Forebay
    - Construct new, state-of-the-art fish screens at the Skinner Fish Facility
  - Tracy Pumping Plant
    - Construct interconnection with Clifton Court Forebay, with 2 sets of radial gates and 10,300 cfs capacity
    - Construct new, state-of-the-art fish screens at the Tracy Pumping Plant intake

- 3.0 MAF Upstream (Sacramento River Tributaries) Storage
- 500 TAF Upstream (San Joaquin River Tributaries) Storage
- 2.0 MAF Aqueduct Storage
- 200 TAF In-Delta Storage
- 500 TAF Groundwater Storage (Sacramento Valley)
- 500 TAF Groundwater Storage (San Joaquin Valley)

Alternative 3C

- Isolated Facility - 5,000 cfs Buried Pipeline
  - Intake Facility with Fish Screens
    - intake channel
    - floating deflector plate
    - trash rack
    - stop logs
    - vertical flatplate "V" fish screens with baffles
    - sedimentation basin
  - Highway 160 Bridge
    - relocate highway
    - breach levee
    - ring levee
    - new bridge
  - Fish Bypass
    - bypass structure
    - adjustable inclined weir
    - six fish bays
    - fish pumpback facility
    - piped bypass system
    - fish outlet structure
  - Low Lift Pumping Plant
    - control building
    - six unit - pump facility
    - inlet and outlet valves
    - service bay
    - bridge crane
    - transformers
    - switchyard boards, gear and equipment

- Buried Pipe
  - Three 18-foot Inside Diameter cast-in-place concrete pipes - 45 miles
- Siphons
  - Stone Lake
  - Mokelumne River
  - Beaver Slough
  - Hog Slough
  - Sycamore Slough
  - Disappointment Slough
  - San Joaquin River
  - Middle River
- Buried Outlet
  - Clifton Court Forebay

- North Delta Channel Improvement
  - New Hope Tract Setback Channel
    - Purchase 600 foot alignment along Mokelumne River, I-5 to New Hope Landing
    - Construct new setback levees from I-5 to New Hope Landing, set back 500 feet from existing channel
    - Relocate New Hope Landing and Wimpy's Marina to coincide with new setback levee
    - Remove existing levee sections where they would obstruct new channel, west and south levee sections
    - Construct new 500 foot bridge across setback channel, with sufficient elevation to allow small craft passage
    - Rebuild existing New Hope Tract levee, New Hope Landing to
    - Beaver Slough
    - Construct new, relocated irrigation diversions and drainage pumps for New Hope Tract
    - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion

- North Mokelumne Setback Channel

  - Purchase 600 foot alignment along North Mokelumne River, New Hope Landing to south end of Tyler Island, alternating between Staten Island and Tyler Island sides as shown
  - Construct new setback levees along North Mokelumne River, New Hope Landing to south end of Tyler Island, alternating between Staten Island and Tyler Island sides as shown
  - Remove existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
  - Construct new 500 foot bridge, Thornton-Walnut Grove Road across setback channel, with sufficient elevation to allow small craft passage
  - Construct new, relocated irrigation diversions and drainage pumps for Staten Island and Tyler Island
  - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion

- Lower Mokelumne Setback Channel

  - Purchase 600 foot alignment along lower Mokelumne River on western portion of Bouldin Island
  - Construct new setback levees along lower Mokelumne River on western portion of Bouldin Island, approximately 500 feet east of existing levees, as shown
  - Excavate existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
  - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion
  - Construct new 500 foot bridge, Highway 12 crossing of lower Mokelumne River across setback channel, with sufficient elevation to allow small craft passage
  - Construct new, relocated irrigation diversions and drainage pumps for western portion of Bouldin Island

- South Delta Improvements

  - Clifton Court Forebay Intake Structure

    - 220' x 60' x 28' concrete structure
    - Six steel radial gates 30' x 29'
    - 2,600 linear feet of new levee section from West Canal to CCFB

  - Channel Dredging Along a 4.9 mile Reach in Old River

    - Dredging of about 1.24 million cubic yards of material
    - Disposal of material
    - Berm creation with dried dredged material

- Old River Fish Control Structure

  - 415' x 35' concrete structure
  - Eight vertical lift gates 45' x 10'
  - Vertical gate storage area
  - Stationary crib crane
  - Docking facilities

- Middle River Flow Control Structure

  - Two 25' x 16' radial gates
  - Concrete bay structure
  - Boat ramps
  - Sheet pile wall
  - Permanent storage facility
  - Access road

- Grant Line Canal Flow Control Structure

  - Four 20' x 16' radial gates
  - Buried utility lines
  - Access road
  - Storage area
  - 50' x105' boating dock
  - 50' flashboard emergency access and microwave tower
  - Control building

- Old River Flow Control Structure

  - Three 20' x 15' radial gates
  - Concrete control structure
  - Steel sheet-pile wall
  - Channel dredging
  - Buried utility lines
  - Access road
  - Storage area
  - 50' x 105' boat lock
  - 1,000 feet of new levee
  - 50' flashboard emergency access and microwave tower
  - Control building

Alternative 3D

- Isolated Facility - 5,000 cfs Buried Pipeline
  - Intake Facility with Fish Screens
    - intake channel
    - floating deflector plate
    - trash rack
    - stop logs
    - vertical flatplate "V" fish screens with baffles
    - sedimentation basin
  - Highway 160 Bridge
    - relocate highway
    - breach levee
    - ring levee
    - new bridge
  - Fish Bypass
    - bypass structure
    - adjustable inclined weir
    - six fish bays
    - fish pumpback facility
    - piped bypass system
    - fish outlet structure
  - Low Lift Pumping Plant
    - control building
    - six unit - pump facility
    - inlet and outlet valves
    - service bay
    - bridge crane
    - transformers
    - switchyard boards, gear and equipment

- Buried Pipe
  - Three 18-foot Inside Diameter cast-in-place concrete pipes - 45 miles
- Siphons
  - Stone Lake
  - Mokelumne River
  - Beaver Slough
  - Hog Slough
  - Sycamore Slough
  - Disappointment Slough
  - San Joaquin River
  - Middle River
- Buried Outlet
  - Clifton Court Forebay

- North Delta Channel Improvement
  - New Hope Tract Setback Channel
    - Purchase 600 foot alignment along Mokelumne River, I-5 to New Hope Landing
    - Construct new setback levees from I-5 to New Hope Landing, set back 500 feet from existing channel
    - Relocate New Hope Landing and Wimpy's Marina to coincide with new setback levee
    - Remove existing levee sections where they would obstruct new channel, west and south levee sections
    - Construct new 500 foot bridge across setback channel, with sufficient elevation to allow small craft passage
    - Rebuild existing New Hope Tract levee, New Hope Landing to
    - Beaver Slough
    - Construct new, relocated irrigation diversions and drainage pumps for New Hope Tract
    - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion

- North Mokelumne Setback Channel

  - Purchase 600 foot alignment along North Mokelumne River, New Hope Landing to south end of Tyler Island, alternating between Staten Island and Tyler Island sides as shown
  - Construct new setback levees along North Mokelumne River, New Hope Landing to south end of Tyler Island, alternating between Staten Island and Tyler Island sides as shown
  - Remove existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
  - Construct new 500 foot bridge, Thornton-Walnut Grove Road across setback channel, with sufficient elevation to allow small craft passage
  - Construct new, relocated irrigation diversions and drainage pumps for Staten Island and Tyler Island
  - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion

- Lower Mokelumne Setback Channel

  - Purchase 600 foot alignment along lower Mokelumne River on western portion of Bouldin Island
  - Construct new setback levees along lower Mokelumne River on western portion of Bouldin Island, approximately 500 feet east of existing levees, as shown
  - Excavate existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
  - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion
  - Construct new 500 foot bridge, Highway 12 crossing of lower Mokelumne River across setback channel, with sufficient elevation to allow small craft passage
  - Construct new, relocated irrigation diversions and drainage pumps for western portion of Bouldin Island

- South Delta Improvements

  - Clifton Court Forebay Intake Structure

    - 220' x 60' x 28' concrete structure
    - Six steel radial gates 30' x 29'
    - 2,600 linear feet of new levee section from West Canal to CCFB

  - Channel Dredging Along a 4.9 mile Reach in Old River

    - Dredging of about 1.24 million cubic yards of material
    - Disposal of material
    - Berm creation with dried dredged material

- Old River Fish Control Structure

  - 415' x 35' concrete structure
  - Eight vertical lift gates 45' x 10'
  - Vertical gate storage area
  - Stationary crib crane
  - Docking facilities

- Middle River Flow Control Structure

  - Two 25' x 16' radial gates
  - Concrete bay structure
  - Boat ramps
  - Sheet pile wall
  - Permanent storage facility
  - Access road

- Grant Line Canal Flow Control Structure

  - Four 20' x 16' radial gates
  - Buried utility lines
  - Access road
  - Storage area
  - 50' x105' boating dock
  - 50' flashboard emergency access and microwave tower
  - Control building

- Old River Flow Control Structure

  - Three 20' x 15' radial gates
  - Concrete control structure
  - Steel sheet-pile wall
  - Channel dredging
  - Buried utility lines
  - Access road
  - Storage area
  - 50' x 105' boat lock
  - 1,000 feet of new levee
  - 50' flashboard emergency access and microwave tower
  - Control building

- CVP-SWP Improvements
  - Clifton Court Forebay
    - Construct new, state-of-the-art fish screens at the Skinner Fish Facility
  - Tracy Pumping Plant
    - Construct interconnection with Clifton Court Forebay, with 2 sets of radial gates and 10,300 cfs capacity
    - Construct new, state-of-the-art fish screens at the Tracy Pumping Plant intake
- 3.0 MAF Upstream (Sacramento River Tributaries) Storage
- 500 TAF Upstream (San Joaquin River Tributaries) Storage
- 2.0 MAF Aqueduct Storage
- 200 TAF In-Delta Storage
- 500 TAF Groundwater Storage (Sacramento Valley)
- 500 TAF Groundwater Storage (San Joaquin Valley)

Alternative 3E

- 15,000 cfs Open Channel Isolated Facility

  - Screened Intake at Hood: Offstream folded "V"

    - Relocation of Highway 160 and new bridge over diversion
    - Trashrack
    - Flood Gates or stop logs
    - Crane
    - Levees
    - Sedimentation Basin
    - Pumping Plant and discharge pipes over levee
    - Fish Bypass System: Pump, Evaluation Facility, Return Pipe, Discharge Structure
    - Control Building, Parking, Access, Lighting, Fencing

  - Alternate Intake at Babel Slough (River Mile 30)

    - Relocation of South River Road and new bridge over diversion
    - Trashrack
    - Flood Gates or stop logs
    - Crane
    - Levees
    - Sedimentation Basin
    - Pumping Plant and discharge to open channel
    - Fish Bypass System: Pump, Evaluation Facility, Return Pipe, Discharge Structure
    - Control Building, Parking, Access, Lighting, Fencing
    - Open channel southeast Sacramento River at RM 25
    - Siphon under Sacramento River
    - Open channel south to Hood
    - Bridge, Hood-Franklin Road

  - Open Channel, Hood to Lambert Road along west side of SPRR embankment

    - Acquire land along alignment, 2000-foot swath
    - Open channel construction
    - Siphon under Snodgrass Slough

  - Open Channel, Glanville Tract

    - Acquire land along alignment, 2000-foot swath, include existing borrow pits 1-4
    - Open channel construction
    - Siphon under Mokelumne River floodway
    - Check structures as required

- Open Channel, New Hope Tract

  - Acquire land along alignment, 2000-foot swath, include existing borrow pit 5
  - Open channel construction
  - Barber Road bridge
  - Thornton-Walnut Grove bridge
  - Siphon under Beaver Slough
  - Check structures as required

- Open Channel, Canal Ranch

  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - Siphon under Hog Slough
  - Check structures as required

- Open Channel, Brack Tract

  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - Woodbridge Road bridge
  - Siphon under Sycamore Slough
  - Check structures as required

- Open Channel, Terminous Tract

  - Acquire land along alignment, 2000-foot swath, include existing borrow pits
  - Open channel construction
  - Highway 12 bridge
  - Check structures as required

- Open Channel, Shin Kee Tract

  - Acquire land along alignment, 2000-foot swath, include existing borrow pits 9-12
  - White Slough local drainage structures
  - Open channel construction
  - Check structures as required

- Open Channel, Rio Blanco Tract

  - Acquire land along alignment, 2000-foot swath, include existing borrow pit 13
  - Open channel construction
  - Telephone Cut, Relocate pumping station and cut off easterly end of Telephone Cut
  - Check structures as required

- Open Channel, Bishop Tract

  - Acquire land along NEW alignment, 2000-foot swath as shown
  - Open channel construction
  - Eightmile Road bridge
  - Siphon under Disappointment Slough
  - Check structures as required

- Open Channel, Rindge Tract

  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - Siphon under San Joaquin River
  - Check structures as required

- Open Channel, Roberts Island

  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - House Road bridge
  - Relocation, Mokelumne River Aqueduct
  - Jacobs Road bridge
  - Inland Road bridge
  - Atchison Topeka RR bridge
  - Highway 4 bridge
  - Kingston School Road bridge
  - Siphon under Middle River
  - Check structures as required

- Open Channel, Union Island

  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - Bonetti Road bridge
  - Siphon under Old River
  - Check structures as required

- Open Channel, Coney Island

  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - Siphon under West Canal

- North Delta Channel Improvement

  - New Hope Tract Setback Channel

    - Purchase 600 foot alignment along Mokelumne River, I-5 to New Hope Landing
    - Construct new setback levees from I-5 to New Hope Landing, set back 500 feet from existing channel
    - Relocate New Hope Landing and Wimpy's Marina to coincide with new setback levee
    - Remove existing levee sections where they would obstruct new channel, west and south levee sections
    - Construct new 500 foot bridge across setback channel, with sufficient elevation to allow small craft passage
    - Rebuild existing New Hope Tract levee, New Hope Landing to
    - Beaver Slough
    - Construct new, relocated irrigation diversions and drainage pumps for New Hope Tract
    - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion

  - North Mokelumne Setback Channel

    - Purchase 600 foot alignment along North Mokelumne River, New Hope Landing to south end of Tyler Island, alternating between Staten Island and Tyler Island sides as shown
    - Construct new setback levees along North Mokelumne River, New Hope Landing to south end of Tyler Island, alternating between Staten Island and Tyler Island sides as shown
    - Remove existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
    - Construct new 500 foot bridge, Thornton-Walnut Grove Road across setback channel, with sufficient elevation to allow small craft passage
    - Construct new, relocated irrigation diversions and drainage pumps for Staten Island and Tyler Island
    - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion

- Lower Mokelumne Setback Channel
  - Purchase 600 foot alignment along lower Mokelumne River on western portion of Bouldin Island
  - Construct new setback levees along lower Mokelumne River on western portion of Bouldin Island, approximately 500 feet east of existing levees, as shown
  - Excavate existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
  - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion
  - Construct new 500 foot bridge, Highway 12 crossing of lower Mokelumne River across setback channel, with sufficient elevation to allow small craft passage
  - Construct new, relocated irrigation diversions and drainage pumps for western portion of Bouldin Island

- CVP-SWP Improvements
  - Clifton Court Forebay
    - Construct new intake at northern end of Clifton Court
    - Construct new, state-of-the-art fish screens at the Skinner Fish Facility
  - Tracy Pumping Plant
    - Construct interconnection with Clifton Court Forebay, with 2 sets of radial gates and 10,300 cfs capacity
    - Construct new, state-of-the-art fish screens at the Tracy Pumping Plant intake

- 3.0 MAF Upstream (Sacramento River Tributaries) Storage
- 500 TAF Upstream (San Joaquin River Tributaries) Storage
- 2.0 MAF Aqueduct Storage
- 200 TAF In-Delta Storage
- 500 TAF Groundwater Storage (Sacramento Valley)
- 500 TAF Groundwater Storage (San Joaquin Valley)

Alternative 3F

- Chain of Lakes with 10,000 cfs DXC Intake plus 5,000 cfs Distributed Pumps
  - Enlarge Delta Cross Channel
    - Purchase 300-foot alignment along north bank of Delta Cross Channel, for gates and transition channel. Purchase 1000-foot alignment along south bank of Delta Cross Channel and Snodgrass Slough
    - Construct new Highway 160 Bridge
    - Construct 2 new radial gates north of existing gates, in supplemental intake channel
    - Construct open channel, 500 feet wide. Close d/s end of Delta Cross Channel. Existing Snodgrass Slough levee is strengthened and rip rapped, new setback levee constructed, including rip-rap, to create new isolated channel.
    - Relocate radio tower cable anchors as necessary
  - Delta Cross Channel Fish Screen
    - Construct multiple folded "V" fish screen installation in Delta Cross Channel downstream of radial gates
    - Construct low lift pump station downstream from fish screens to control hydraulic performance of fish screens
    - Fish Bypass System: Pump, Evaluation Facility, Return Pipe, Discharge Structure
    - Control Building, Parking, Access, Lighting, Fencing
  - Tyler Island Isolated Conveyance
    - Purchase Tyler Island, except for northwest corner along Thornton-Walnut Grove Road. Purchase or rebuild gas wells. Purchase other infrastructure.
    - Levees, with patrol roads to remain intact. Rip-rap interior slopes of levees to protect against wave wash. Strengthen levees as required
    - Extend north levee of new isolated conveyance channel to Georgiana Slough, southwest of Thornton-Walnut Grove Road
    - Distributed pump stations with cylindrical screens to facilitate filling island from adjacent channel and returning flow from storage
    - New bridge for Thornton-Walnut Grove Road across new isolated channel
    - Siphons under Mokelumne River, from Tyler island to Bouldin Island (note deep peat in this area)

- Bouldin Island Isolated Conveyance

  - Purchase Bouldin Island, including 4 homes along north levee
  - Protect interior levee slopes of island with rip-rap. Strengthen levees as required
  - Construct elevated embankment roadway across Bouldin Island, except for new bridge; protect both north and south sides with rip-rap.
  - Construct 500-foot bridge at west end of Bouldin Island to facilitate transfer flows to move to San Joaquin River
  - Construct low lift pump station and siphons under Potato Slough to Venice Island
  - Distributed pump stations with cylindrical screens to facilitate filling island from adjacent channel and returning flow from storage
  - Construct seepage interception wells along channels adjacent to islands and tracts devoted to isolated conveyance to include Brannan Andrus Island, Medford Island, Empire Tract, Terminous Tract, Staten Island, Bradford Island

- Venice Island Isolated Conveyance

  - Purchase Venice Island
  - Protect interior levee slopes of island with rip-rap. Strengthen levees as required
  - Siphons under San Joaquin River to Mandeville Island, southwest corner of island
  - Distributed pump stations with cylindrical screens to facilitate filling island from adjacent channel and returning flow from storage

- Mandeville Island Isolated Conveyance

  - Purchase Mandeville Island
  - Protect interior levee slopes of island with rip-rap. Strengthen levees as required
  - Low lift pump station and siphons under Old River to Bacon Island, located on southeast side of Mandeville Island
  - Distributed pump stations with cylindrical screens to facilitate filling island from adjacent channel and returning flow from storage

- Bacon Island Isolated Conveyance

  - Purchase Bacon Island
  - Protect interior levee slopes of island with rip-rap. Strengthen levees as required
  - Low lift pumps and siphons under borrow channel, railroad, and Mokelumne River Aqueduct to Woodward Island, on middle of south levee
  - Distributed pump stations with cylindrical screens to facilitate filling island from adjacent channel and returning flow from storage

- Woodward Island Isolated Conveyance

  - Purchase Woodward Island
  - Protection of Mokelumne River Aqueduct through appropriate relocation (elevation?) or construction of new levee across north end of Woodward Island
  - Protect interior levee slopes of island with rip-rap. Strengthen levees as required
  - Siphons under Woodward Canal to Victoria Island, located on center of south end of island
  - Distributed pump stations with cylindrical screens to facilitate filling island from adjacent channel and returning flow from storage

- Victoria Island Isolated Conveyance

  - Purchase Victoria Island
  - Protect interior levee slopes of island with rip-rap. Strengthen levees as required
  - Construct elevated embankment roadway for Highway 4 across Victoria Island, except for new bridge; protect both north and south sides with rip-rap.
  - Construct 500-foot bridge at center of Victoria Bouldin Island to facilitate transfer flows to move across island
  - Construct siphons under Old River to Clifton Court Forebay, just south of Kings Island
  - Distributed pump stations with cylindrical screens to facilitate filling island from adjacent channel and returning flow from storage

- North Delta Channel Improvement

  - New Hope Tract Setback Channel

    - Purchase 600 foot alignment along Mokelumne River, I-5 to New Hope Landing
    - Construct new setback levees from I-5 to New Hope Landing, set back 500 feet from existing channel
    - Relocate New Hope Landing and Wimpy's Marina to coincide with new setback levee
    - Remove existing levee sections where they would obstruct new channel, west and south levee sections
    - Construct new 500 foot bridge across setback channel, with sufficient elevation to allow small craft passage
    - Rebuild existing New Hope Tract levee, New Hope Landing to
    - Beaver Slough
    - Construct new, relocated irrigation diversions and drainage pumps for New Hope Tract
    - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion

- North Mokelumne Setback Channel

  - Purchase 600 foot alignment along North Mokelumne River, New Hope Landing to south end of Tyler Island, alternating between Staten Island and Tyler Island sides as shown
  - Construct new setback levees along North Mokelumne River, New Hope Landing to south end of Tyler Island, alternating between Staten Island and Tyler Island sides as shown
  - Remove existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
  - Construct new 500 foot bridge, Thornton-Walnut Grove Road across setback channel, with sufficient elevation to allow small craft passage
  - Construct new, relocated irrigation diversions and drainage pumps for Staten Island and Tyler Island
  - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion

- Lower Mokelumne Setback Channel

  - Purchase 600 foot alignment along lower Mokelumne River on western portion of Bouldin Island
  - Construct new setback levees along lower Mokelumne River on western portion of Bouldin Island, approximately 500 feet east of existing levees, as shown
  - Excavate existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
  - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion
  - Construct new 500 foot bridge, Highway 12 crossing of lower Mokelumne River across setback channel, with sufficient elevation to allow small craft passage
  - Construct new, relocated irrigation diversions and drainage pumps for western portion of Bouldin Island

- CVP-SWP Improvements

  - Clifton Court Forebay
    - Construct new, state-of-the-art fish screens at the Skinner Fish Facility

  - Tracy Pumping Plant
    - Construct interconnection with Clifton Court Forebay, with 2 sets of radial gates and 10,300 cfs capacity
    - Construct new, state-of-the-art fish screens at the Tracy Pumping Plant intake

- 3.0 MAF Upstream (Sacramento River Tributaries) Storage
- 500 TAF Upstream (San Joaquin River Tributaries) Storage
- 2.0 MAF Aqueduct Storage
- 500 TAF Groundwater Storage (Sacramento Valley)
- 500 TAF Groundwater Storage (San Joaquin Valley)

Alternative 3G

- 5,000 cfs Screened Deep Water Ship Channel and West Delta Tunnel
  - Screened Diversion from Sacramento River
    - Trashrack
    - Flood Gates or stop logs
    - Crane
    - Levees
    - Sedimentation Basin
    - Pumping Plant and discharge pipes into turning basin
    - Fish Bypass System: Pump, Evaluation Facility, Return Pipe, Discharge Structure
    - Control Building, Parking, Access, Lighting, Fencing
  - Sacramento River Deep Water Ship Channel Closure and Pumps
    - Sub-Component 1: Close Port of Sacramento. Purchase port facilities and channel from Corps and Port Authority. Build rock dam at mouth of ship channel, near mile 18.7
    - Sub-Component 2: Assume continued large boat traffic which requires construction of a lock at mile 19, to protect water quality and prevent fish passage into channel
  - Unscreened Pumping Plant at mile 18.7
    - Build elevated foundation pad and access road down west ship channel levee
    - Construct unscreened pumping plant to pump water to Brentwood via pressure pipeline. Dual intake Component included: Can draw from downstream or upstream of dam/lock structure.
    - Valve structure: Two incoming pipelines-- from Berryessa Intertie and to Brentwood. Facility should have capability of pumping to Berryessa Intertie, to Brentwood, allowing flow to go from Berryessa Intertie to Brentwood, or be released into Ship Channel or Cache Slough
  - Siphon under Cache Slough
  - Pipeline to Sacramento River Downstream of Rio Vista
    - Siphon under Sacramento and San Joaquin River, west end of Sherman Island
    - Pipeline terminus structure at Brentwood
  - Open Channel from Brentwood to Clifton Court Forebay

❖ North Delta Channel Improvement

➢ New Hope Tract Setback Channel

- Purchase 600 foot alignment along Mokelumne River, I-5 to New Hope Landing
- Construct new setback levees from I-5 to New Hope Landing, set back 500 feet from existing channel
- Relocate New Hope Landing and Wimpy's Marina to coincide with new setback levee
- Remove existing levee sections where they would obstruct new channel, west and south levee sections
- Construct new 500 foot bridge across setback channel, with sufficient elevation to allow small craft passage
- Rebuild existing New Hope Tract levee, New Hope Landing to
- Beaver Slough
- Construct new, relocated irrigation diversions and drainage pumps for New Hope Tract
- Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion

➢ North Mokelumne Setback Channel

- Purchase 600 foot alignment along North Mokelumne River, New Hope Landing to south end of Tyler Island, alternating between Staten Island and Tyler Island sides as shown
- Construct new setback levees along North Mokelumne River, New Hope Landing to south end of Tyler Island, alternating between Staten Island and Tyler Island sides as shown
- Remove existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
- Construct new 500 foot bridge, Thornton-Walnut Grove Road across setback channel, with sufficient elevation to allow small craft passage
- Construct new, relocated irrigation diversions and drainage pumps for Staten Island and Tyler Island
- Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion

- Lower Mokelumne Setback Channel

  - Purchase 600 foot alignment along lower Mokelumne River on western portion of Bouldin Island
  - Construct new setback levees along lower Mokelumne River on western portion of Bouldin Island, approximately 500 feet east of existing levees, as shown
  - Excavate existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
  - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion
  - Construct new 500 foot bridge, Highway 12 crossing of lower Mokelumne River across setback channel, with sufficient elevation to allow small craft passage
  - Construct new, relocated irrigation diversions and drainage pumps for western portion of Bouldin Island

- South Delta Improvements

  - Clifton Court Forebay Intake Structure

    - 220' x 60' x 28' concrete structure
    - Six steel radial gates 30' x 29'
    - 2,600 linear feet of new levee section from West Canal to CCFB

  - Channel Dredging Along a 4.9 mile Reach in Old River

    - Dredging of about 1.24 million cubic yards of material
    - Disposal of material
    - Berm creation with dried dredged material

  - Old River Fish Control Structure

    - 415' x 35' concrete structure
    - Eight vertical lift gates 45' x 10'
    - Vertical gate storage area
    - Stationary crib crane
    - Docking facilities

  - Middle River Flow Control Structure

    - Two 25' x 16' radial gates
    - Concrete bay structure
    - Boat ramps
    - Sheet pile wall
    - Permanent storage facility
    - Access road

- *Grant Line Canal Flow Control Structure*
  - Four 20' x 16' radial gates
  - Buried utility lines
  - Access road
  - Storage area
  - 50' x105' boating dock
  - 50' flashboard emergency access and microwave tower
  - Control building

- Old River Flow Control Structure
  - Three 20' x 15' radial gates
  - Concrete control structure
  - Steel sheet-pile wall
  - Channel dredging
  - Buried utility lines
  - Access road
  - Storage area
  - 50' x 105' boat lock
  - 1,000 feet of new levee
  - 50' flashboard emergency access and microwave tower
  - Control building

- CVP-SWP Improvements
  - Clifton Court Forebay
    - Construct new, state-of-the-art fish screens at the Skinner Fish Facility
  - Tracy Pumping Plant
    - Construct interconnection with Clifton Court Forebay, with 2 sets of radial gates and 10,300 cfs capacity
    - Construct new, state-of-the-art fish screens at the Tracy Pumping Plant intake

- 3.0 MAF Upstream (Sacramento River Tributaries) Storage

- 500 TAF Upstream (San Joaquin River Tributaries) Storage

- 2.0 MAF Aqueduct Storage

- 200 TAF In-Delta Storage

- 500 TAF Groundwater Storage (Sacramento Valley)

- 500 TAF Groundwater Storage (San Joaquin Valley)

Alternative 3H

- 5,000 cfs Open Channel Isolated Facility
  - Screened Intake at Hood: Offstream folded "V"
    - Relocation of Highway 160 and new bridge over diversion
    - Trashrack
    - Flood Gates or stop logs
    - Crane
    - Levees
    - Sedimentation Basin
    - Pumping Plant and discharge pipes over levee
    - Fish Bypass System: Pump, Evaluation Facility, Return Pipe, Discharge Structure
    - Control Building, Parking, Access, Lighting, Fencing
  - Alternate Intake at Babel Slough (River Mile 30)
    - Relocation of South River Road and new bridge over diversion
    - Trashrack
    - Flood Gates or stop logs
    - Crane
    - Levees
    - Sedimentation Basin
    - Pumping Plant and discharge to open channel
    - Fish Bypass System: Pump, Evaluation Facility, Return Pipe, Discharge Structure
    - Control Building, Parking, Access, Lighting, Fencing
    - Open channel southeast Sacramento River at RM 25
    - Siphon under Sacramento River
    - Open channel south to Hood
    - Bridge, Hood-Franklin Road
  - Open Channel, Hood to Lambert Road along west side of SPRR embankment
    - Acquire land along alignment, 2000-foot swath
    - Open channel construction
    - Siphon under Snodgrass Slough
  - Open Channel, Glanville Tract
    - Acquire land along alignment, 2000-foot swath, include existing borrow pits 1-4
    - Open channel construction
    - Siphon under Mokelumne River floodway
    - Check structures as required

- Open Channel, New Hope Tract

  - Acquire land along alignment, 2000-foot swath, include existing borrow pit 5
  - Open channel construction
  - Barber Road bridge
  - Thornton-Walnut Grove bridge
  - Siphon under Beaver Slough
  - Check structures as required

- Open Channel, Canal Ranch

  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - Siphon under Hog Slough
  - Check structures as required

- Open Channel, Brack Tract

  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - Woodbridge Road bridge
  - Siphon under Sycamore Slough
  - Check structures as required

- Open Channel, Terminous Tract

  - Acquire land along alignment, 2000-foot swath, include existing borrow pits
  - Open channel construction
  - Highway 12 bridge
  - Check structures as required

- Open Channel, Shin Kee Tract

  - Acquire land along alignment, 2000-foot swath, include existing borrow pits 9-12
  - White Slough local drainage structures
  - Open channel construction
  - Check structures as required

- Open Channel, Rio Blanco Tract

  - Acquire land along alignment, 2000-foot swath, include existing borrow pit 13
  - Open channel construction
  - Telephone Cut, Relocate pumping station and cut off easterly end of Telephone Cut
  - Check structures as required

- Open Channel, Bishop Tract

  - Acquire land along NEW alignment, 2000-foot swath as shown
  - Open channel construction
  - Eightmile Road bridge
  - Siphon under Disappointment Slough
  - Check structures as required

- Open Channel, Rindge Tract

  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - Siphon under San Joaquin River
  - Check structures as required

- Open Channel, Roberts Island

  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - House Road bridge
  - Relocation, Mokelumne River Aqueduct
  - Jacobs Road bridge
  - Inland Road bridge
  - Atchison Topeka RR bridge
  - Highway 4 bridge
  - Kingston School Road bridge
  - Siphon under Middle River
  - Check structures as required

- Open Channel, Union Island

  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - Bonetti Road bridge
  - Siphon under Old River
  - Check structures as required

- Open Channel, Coney Island

  - Acquire land along alignment, 2000-foot swath
  - Open channel construction
  - Siphon under West Canal

- Tracy Pumping Plant

  - Construct interconnection with Clifton Court Forebay, with 2 sets of radial gates and 10,300 cfs capacity
  - Construct new, state-of-the-art fish screens at the Tracy Pumping Plant intake (for 5,000 cfs and 10,000 cfs Components)

- Tyler Island Habitat
  - Andrus Island Setback Channel
    - Purchase Alignment, northeast corner of Andrus Island
    - Construct setback levee, 500 feet west of Georgiana Slough, from Sacramento River to weir intake as shown
    - Excavate existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
    - Construct new 500 foot bridge and elevated roadway from Georgiana Slough swing bridge to junction with existing Isleton Road, with sufficient elevation to allow small craft passage
    - Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion
  - Tyler Island Aquatic Habitat
    - Construct 600-foot wide North Weir in levee near northwest section of Tyler Island, with inflatable rubber dam to control weir elevation
    - Construct bridge across North Weir apron for maintenance access and access to levee road
    - Construct channel section control in Georgiana Slough to prevent accelerated erosion of channel bottom; armoring with rip-rap or gabion baskets across entire section, for 100 feet
    - Place rip-rap along interior levee slopes of remaining levees around island to protect against wave wash. Georgiana Slough levee must remain intact to maintain flood flow distribution
    - Breach 2000 feet of levee on northeast side of island
    - Construct new levee from North Weir to breach of levee on northeast side of island
    - Construct bridge over new flood channel created by northeast levee breach for Thornton-Walnut Grove Road
- Mokelumne River Floodway (West)
  - McCormack-Williamson Tract Floodway and Habitat
    - Purchase McCormack-Williamson Tract
    - Excavate levee on northeast end, near I-5, 2000-foot width
    - Excavate levee on southwest , adjacent to Dead Horse Cut, 2000-foot width (Don't rip-rap interior slopes, due to general elevation above sea level)
    - Build bridge and secure access road to radio tower control building

- Dead Horse Island Floodway and Habitat

  - Purchase Dead Horse Island (200 ac) including 1 residence
  - Excavate levee on southwest side of Dead Horse Island, 2000-foot width
  - Excavate levee on northeast side of Dead Horse Island (adjacent to Dead Horse Cut), 2000-foot width
  - Place erosion control rip-rap on remaining interior levee slopes

- Bouldin Island

  - Purchase Bouldin Island
  - Remove 2000-foot section of levee, east bank lower Mokelumne, north of Highway 12
  - Remove 3000-foot section of levee along San Joaquin River between Potato Slough and Mokelumne River
  - Protect remaining interior levee slopes of island with rip-rap; these would become channel islands and help protect adjacent islands against wave wash
  - Construct elevated embankment roadway across Bouldin Island, except for new bridge; protect both north and south sides with rip-rap.
  - Construct 2,000-foot bridge at west end of Bouldin Island to facilitate flood and transfer flows to move to San Joaquin River
  - Construct seepage interception wells along channels adjacent to Bouldin Island including Brannan-Andrus Island, Venice Island, Empire Tract, Terminous Tract and Staten Island

- East Delta Habitat

  - Canal Ranch Tract Wetlands

    - Purchase Canal Ranch Tract
    - Remove 2000-foot sections of levee at west end of Beaver Slough and Hog Slough
    - Protect remaining interior levee slopes with rip-rap; remaining levees would become channel islands, and would help protect adjacent tracts from wave wash
    - Relocate gas pipelines and other utilities as required

  - Brack Tract Wetlands

    - Purchase Brack Tract
    - Remove 2000-foot sections of levee at west end of Hog Slough and Sycamore Slough
    - Protect remaining interior levee slopes with rip-rap. Remaining levees would become channel islands, and would help protect adjacent tracts from wave wash
    - Relocate gas pipelines and other utilities as required

- South Delta Habitat

  - Palm Tract

    - Purchase 3000-foot alignment on eastern portion of Palm Tract
    - Remove 3000 feet of levee on Rock Slough from Old River westward
    - Remove 3000 feet of levee on southeast corner of tract from Old River westward
    - Construct setback levee parallel with Old river, set back about 3000 feet to the west
    - Construct new, relocated irrigation diversions and drainage pumps
    - Place rip-rap on west side of Old River levee, which becomes a channel island

  - Orwood Tract

    - Purchase 3000-foot alignment on eastern portion of Orwood Tract
    - Remove 3000 feet of levee on northeast corner from Old River westward
    - Remove 3000 feet of levee on Indian Slough from Old River westward
    - Construct setback levee parallel with Old river, set back about 3000 feet to the west
    - Construct new, relocated irrigation diversions and drainage pumps
    - Place rip-rap on west side of Old River levee, which becomes a channel island
    - Construct ring levee around Mokelumne River Aqueduct

  - Byron Tract

    - Purchase 3000-foot alignment on eastern portion of Byron Tract, north of Highway 4
    - Remove 1000-feet of levee on Indian Slough from Old River westward
    - Remove 1000-feet of levee along Old River north of Highway 4
    - Construct setback levee parallel with Old river, set back about 3000 feet to the west as far south as Highway 4
    - Construct new, relocated irrigation diversions and drainage pumps
    - Place rip-rap on west side of Old River levee, which becomes a channel island
    - Construct new 3000-foot embankment causeway over new setback channel and new bridge and alignment over Old River for Highway 4

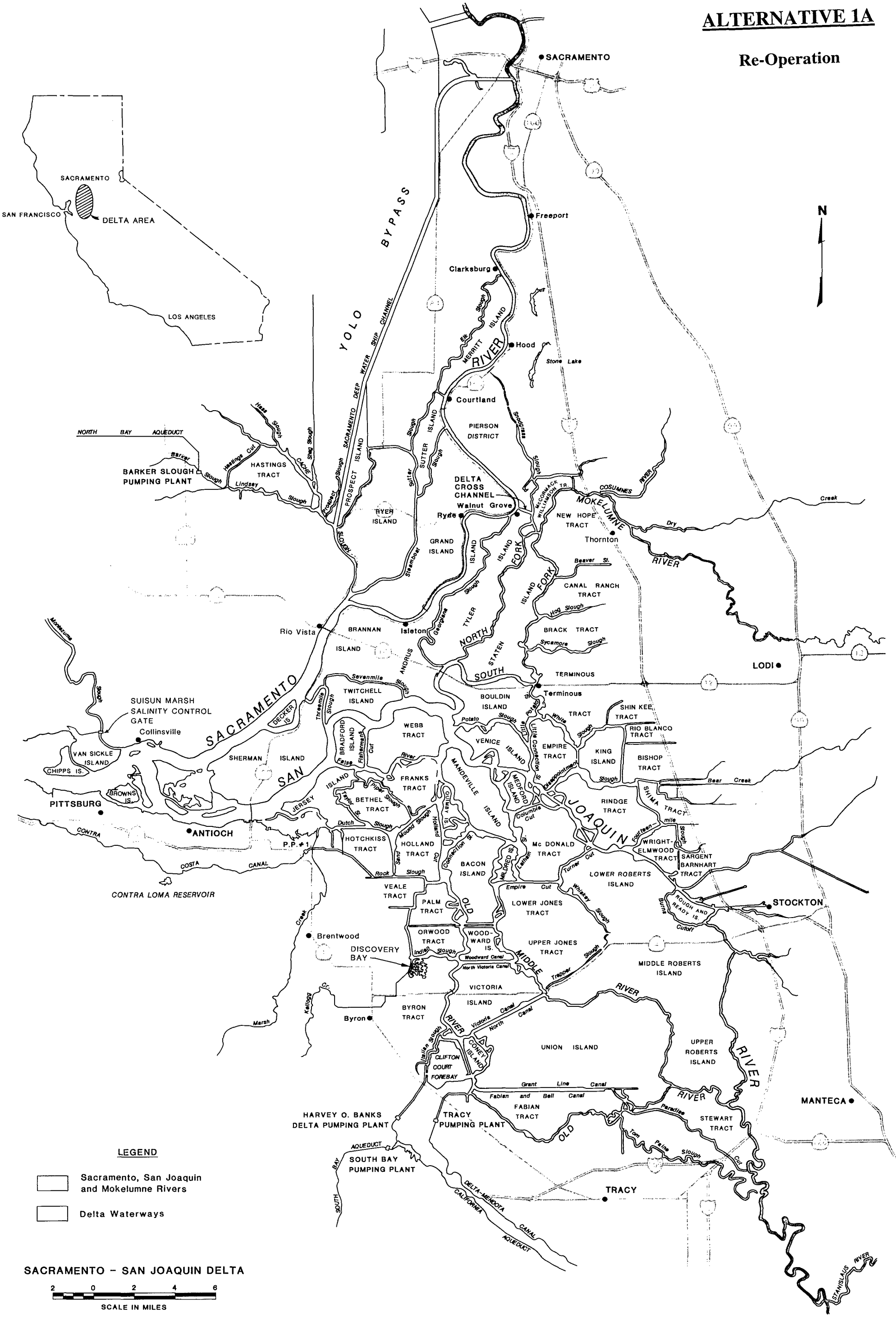
  - Victoria Island

    - Purchase 3000-foot alignment on western portion of Victoria Island south of Highway 4
    - Remove 1000 feet of levee on Old River, south of Highway 4
    - Remove 1000 feet of levee along Old River near Clifton Court Forebay
    - Construct setback levee parallel with Old river, set back about 3000 feet to the west as far south as Clifton Court Forebay
    - Construct new, relocated irrigation diversions and drainage pumps
    - Place rip-rap on east side of Old River levee, which becomes a channel island

- CVP-SWP Improvements
  - Clifton Court Forebay
    - Construct new intake at northern end of Clifton Court
    - Construct new, state-of-the-art fish screens at the Skinner Fish Facility
  - Tracy Pumping Plant
    - Construct interconnection with Clifton Court Forebay, with 2 sets of radial gates and 10,300 cfs capacity
    - Construct new, state-of-the-art fish screens at the Tracy Pumping Plant intake
- 3.0 MAF Upstream Storage (Sacramento River Tributaries)
- 500 TAF Upstream Storage (San Joaquin River Tributaries)
- 2.0 MAF Aqueduct Storage
- 500 TAF Groundwater Storage (Sacramento Valley)
- 500 TAF Groundwater Storage (San Joaquin Valley)

ALTERNATIVE 1A

Re-Operation



LEGEND

- Sacramento, San Joaquin and Mokelumne Rivers
- Delta Waterways

SACRAMENTO – SAN JOAQUIN DELTA

2 0 2 4 6

SCALE IN MILES

72

D—005805

D-005805

ALTERNATIVE 1B

Re-Operation
CVP-SWP Improvements

N

CVP-SWP Improvements : State of the Art Fish Screen Facilities and Intertie between CCFB-Tracy

LEGEND

- Sacramento, San Joaquin and Mokelumne Rivers
- Delta Waterways

SACRAMENTO – SAN JOAQUIN DELTA

2 0 2 4 6

SCALE IN MILES

73

D—005806

D-005806

ALTERNATIVE 1C

Re-Operation
CVP-SWP Improvements
3.0 MAF Upstream Storage on Sac River Tributaries
1.0 MAF Aqueduct Storage
500 TAF Groundwater Storage (Sacramento Valley)
500 TAF Groundwater Storage (San Joaquin Valley)

CVP-SWP Improvements : State of the Art Fish Screen Facilities and Intertie between CCFB-Tracy

South Delta Improvements: Fish and Flow Control Structures and Channel Dredging on Old River

LEGEND

Sacramento, San Joaquin and Mokelumne Rivers

Delta Waterways

SACRAMENTO – SAN JOAQUIN DELTA

2 0 2 4 6

SCALE IN MILES

74

ALTERNATIVE 2A

North Delta Improvements
10,000 cfs Hood Intake
South Delta Improvements

10,000 CFS Screened Intake

Enlarged Channel

Setback Levees (typical)

Channel Dredging

Flow Control Barriers

New Intake Structure

Fish Control Barrier

SACRAMENTO – SAN JOAQUIN DELTA

LEGEND

Sacramento, San Joaquin and Mokelumne Rivers

Delta Waterways

2 0 2 4 6

SCALE IN MILES

75

D—0 0 5 8 0 8

D-005808

ALTERNATIVE 2B

North Delta Improvements
10,000 Hood Intake
South Delta Improvements
CVP-SWP Improvements
3.0 MAF Upstream Storage on Sac River Tributaries
2.0 MAF Aqueduct Storage
500 TAF Groundwater Storage (Sacramento Valley)
500 TAF Groundwater Storage (San Joaquin Valley)

10,000 CFS Screened Intake

Enlarged Channel

Setback Levees (typical)

Channel Dredging

Flow Control Barriers

New Intake Structure

Fish Control Barrier

CVP-SWP Improvements : State of the Art Fish Screen Facilities and Intertie between CCFB-Tracy

LEGEND

Sacramento, San Joaquin and Mokelumne Rivers

Delta Waterways

SACRAMENTO – SAN JOAQUIN DELTA

2 0 2 4 6

SCALE IN MILES

76

D—0 0 5 8 0 9

D-005809

ALTERNATIVE 2C

Western 15,000 CFS Isolated South Delta Intake
Northern 15,000 CFS Isolated South Delta Intake
Eastern 15,000 CFS Isolated South Delta Intake
CVP-SWP Improvements

N

Northern 15,000 CFS Intake

Western 15,000 CFS Intake with siphons (typical)

CVP-SWP Improvements : State of the Art Fish Screen Facilities and Intertie between CCFB-Tracy

Eastern 15,000 CFS Intake

LEGEND

Sacramento, San Joaquin and Mokelumne Rivers

Delta Waterways

SACRAMENTO – SAN JOAQUIN DELTA

2 0 2 4 6

SCALE IN MILES

77

D – 0 0 5 8 1 0

D-005810

ALTERNATIVE 2D

10,000 CFS Hood Intake
Mokelumne River Floodway (East)
East Delta Habitat
South Delta Habitat
CVP-SWP Improvements
2.0 MAF Aqueduct Storage

10,000 CFS Screened Intake

Enlarged Channel

Mokelumne River Floodway with Setback Levees and Conversion of Bouldin Island to Aquatic Habitat

East Delta Wetlands Habitat

Elevated Roadway

South Delta Habitat with Setback Levees

CVP-SWP Improvements : State of the Art Fish Screen Facilities and Intertie between CCFB-Tracy

LEGEND

Sacramento, San Joaquin and Mokelumne Rivers

Delta Waterways

SACRAMENTO – SAN JOAQUIN DELTA

2 0 2 4 6

SCALE IN MILES

78

D – 0 0 5 8 1 1

D-005811

ALTERNATIVE 2E

Tyler Island Habitat
Mokelumne River Floodway (West)
East Delta Habitat
South Delta Habitat
CVP-SWP Improvements
3.0 MAF Upstream Storage on Sac River Tributaries
500 TAF Upstream Storage on San Joaq River Tributaries
2.0 MAF Aqueduct Storage
500 TAF Groundwater Storage (Sacramento Valley)
500 TAF Groundwater Storage (San Joaquin Valley)

Mokelumne River Floodway Including Bouldin Island Used as Aquatic Habitat

Tyler Island Aquatic Habitat and Setback Andrus Levee

East Delta Wetlands Habitat

Elevated Roadway

South Delta Habitat with Setback Levees

CVP-SWP Improvements : State of the Art Fish Screen Facilities and Intertie between CCFB-Tracy

LEGEND

Sacramento, San Joaquin and Mokelumne Rivers

Delta Waterways

SACRAMENTO – SAN JOAQUIN DELTA

2 0 2 4 6

SCALE IN MILES

79

D – 0 0 5 8 1 2

D-005812

ALTERNATIVE 3A

5,000 CFS Open Channel I.F.
North Delta Improvements
South Delta Improvements

SACRAMENTO
Freeport
Clarksburg
Hood
Courtland
Walnut Grove
Ryde
Thornton
Rio Vista
Isleton
Collinsville
Terminous
LODI
STOCKTON
Brentwood
Byron
ANTIOCH
PITTSBURG
MANTECA
TRACY
YOLO BYPASS
SACRAMENTO DEEP WATER SHIP CHANNEL
SACRAMENTO RIVER
SAN JOAQUIN RIVER
MOKELUMNE RIVER
NORTH BAY AQUEDUCT
BARKER SLOUGH PUMPING PLANT
HASTINGS TRACT
LINDSEY SLOUGH
CACHE SLOUGH
HASS SLOUGH
PROSPECT SLOUGH
SUTTER SLOUGH
SUTTER ISLAND
STEAMBOAT SLOUGH
GRAND ISLAND
RYER ISLAND
PIERSON DISTRICT
SNODGRASS SLOUGH
DELTA CROSS CHANNEL
McCORMACK WILLIAMSON TR.
NEW HOPE TRACT
COSUMNES RIVER
Dry Creek
Beaver Slough
CANAL RANCH TRACT
NORTH FORK MOKELUMNE RIVER
SOUTH FORK MOKELUMNE RIVER
Hog Slough
BRACK TRACT
Sycamore Slough
TYLER ISLAND
GEORGIANA SLOUGH
NORTH STATEN ISLAND
SOUTH STATEN ISLAND
ANDRUS ISLAND
BRANNAN ISLAND
TERMINOUS TRACT
BOULDIN ISLAND
SHIN KEE TRACT
RIO BLANCO TRACT
Potato Slough
White Slough
Little Connection Slough
Sevenmile Slough
TWITCHELL ISLAND
Threemile Slough
DECKER IS.
SUISUN MARSH SALINITY CONTROL GATE
Suisun Slough
VAN SICKLE ISLAND
CHIPPS IS.
BROWNS IS.
SHERMAN ISLAND
BRADFORD ISLAND
False River
Fisherman Cut
WEBB TRACT
VENICE ISLAND
EMPIRE TRACT
KING ISLAND
BISHOP TRACT
Bear Creek
FRANKS TRACT
MANDEVILLE ISLAND
MEDFORD ISLAND
Disappointment Slough
Columbia Cut
RINDGE TRACT
SHIMA TRACT
Fourteen Mile Slough
JERSEY ISLAND
Taylor Slough
Piper Slough
BETHEL TRACT
OLD RIVER
Dutch Slough
Mound Slough
Holland Cut
HOTCHKISS TRACT
HOLLAND TRACT
Sand Creek
Connection Slough
BACON ISLAND
Mc DONALD TRACT
WILDRED IS.
Latham Slough
Turner Cut
WRIGHT-ELMWOOD TRACT
SARGENT BARNHART TRACT
LOWER ROBERTS ISLAND
CONTRA COSTA CANAL
CONTRA LOMA RESERVOIR
P.P.#1
Rock Slough
VEALE TRACT
PALM TRACT
Empire Cut
Whiskey Slough
LOWER JONES TRACT
ROUGH AND READY IS.
Burns Cutoff
ORWOOD TRACT
WOODWARD IS.
Indian Slough
Woodward Canal
North Victoria Canal
MIDDLE RIVER
UPPER JONES TRACT
Trapper Slough
MIDDLE ROBERTS ISLAND
VICTORIA ISLAND
Victoria Canal
North Canal
BYRON TRACT
Italian Slough
CLIFTON COURT FOREBAY
CORVETT ISLAND
UPPER ROBERTS ISLAND
Grant Line Canal
Fabian and Bell Canal
FABIAN TRACT
HARVEY O. BANKS DELTA PUMPING PLANT
TRACY PUMPING PLANT
Paradise Cut
STEWART TRACT
Tom Paine Slough
OLD RIVER
AQUEDUCT
SOUTH BAY PUMPING PLANT
DELTA-MENDOTA CANAL
CALIFORNIA AQUEDUCT
STANISLAUS RIVER
Marsh Creek
DISCOVERY BAY

Setback Levees (typical)
Open Channel Isolated Facility
Channel Dredging
Flow Control Barriers
New Intake Structure
Fish Control Barrier

N

LEGEND

Sacramento, San Joaquin and Mokelumne Rivers

Delta Waterways

SACRAMENTO – SAN JOAQUIN DELTA

2 0 2 4 6

SCALE IN MILES

80

D—005813

D-005813

ALTERNATIVE 3B

5,000 CFS Open Channel I.F.
North Delta Improvements
South Delta Improvements
CVP-SWP Improvements
3.0 MAF Upstream Storage on Sac River Tributaries
500 TAF Upstream Storage on San Joaq River Tributaries
2.0 MAF Aqueduct Storage
200 TAF In-Delta Storage
500 TAF Groundwater Storage (Sacramento Valley)
500 TAF Groundwater Storage (San Joaquin Valley)

Setback Levees (typical)

Open Channel Isolated Facility

Channel Dredging

Flow Control Barriers

New Intake Structure

Fish Control Barrier

CVP-SWP Improvements : State of the Art Fish Screen Facilities and Intertie between CCFB-Tracy

LEGEND

Sacramento, San Joaquin and Mokelumne Rivers

Delta Waterways

SACRAMENTO – SAN JOAQUIN DELTA

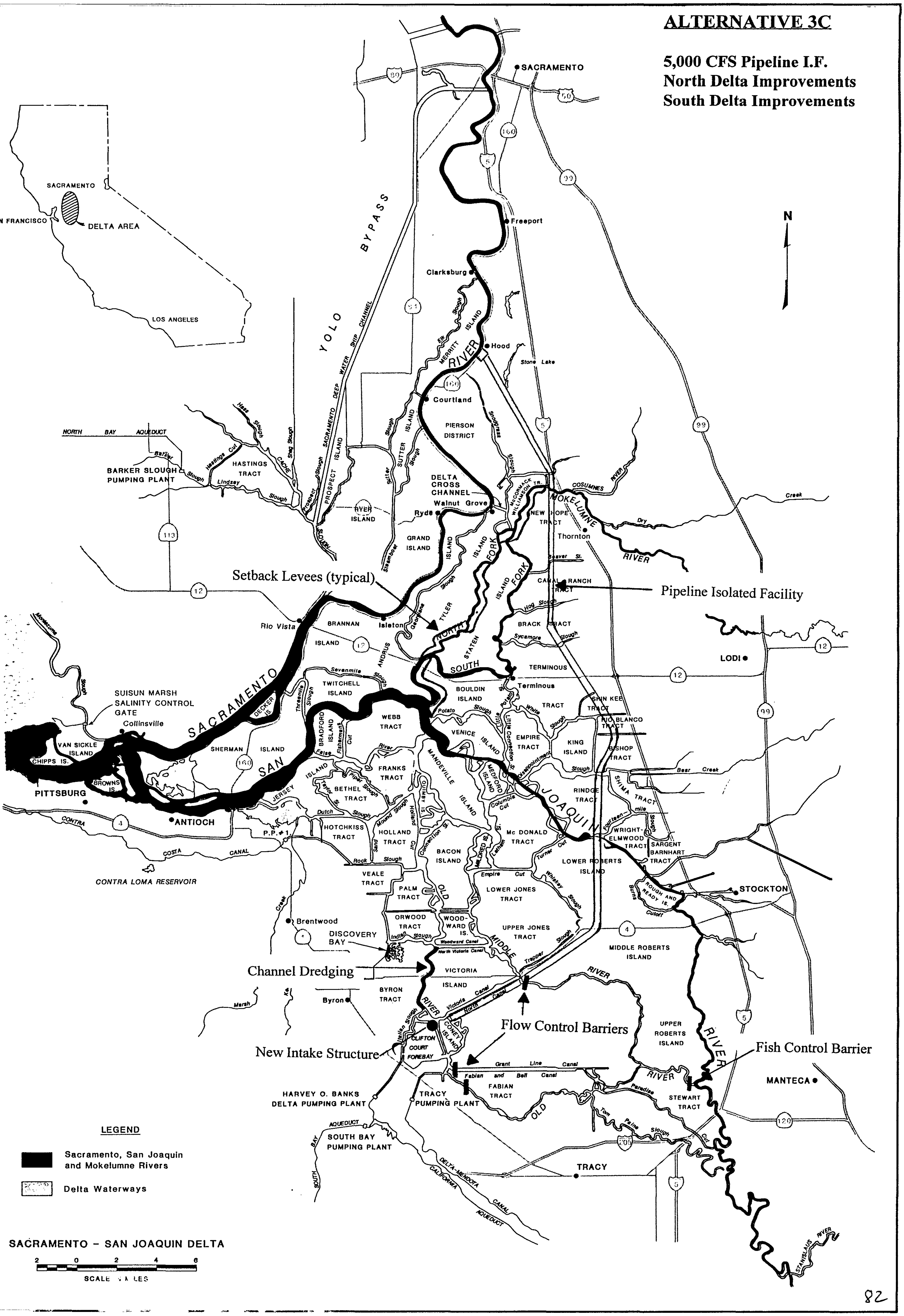
2 0 2 4 6

SCALE IN MILES

81

D—005814

D-005814


ALTERNATIVE 3C
5,000 CFS Pipeline I.F.
North Delta Improvements
South Delta Improvements
N
SACRAMENTO
SAN FRANCISCO
DELTA AREA
LOS ANGELES
Freeport
Clarksburg
Hood
Stone Lake
Courtland
YOLO BYPASS
SACRAMENTO DEEP WATER SHIP CHANNEL
NORTH BAY AQUEDUCT
BARKER SLOUGH PUMPING PLANT
HASTINGS TRACT
PIERSON DISTRICT
DELTA CROSS CHANNEL
Walnut Grove
Ryde
GRAND ISLAND
NEW HOPE TRACT
Thornton
MOKELUMNE RIVER
COSUMNES RIVER
Setback Levees (typical)
Pipeline Isolated Facility
CANAL RANCH TRACT
BRACK TRACT
TERMINOUS
Terminous
LODI
Rio Vista
BRANNAN ISLAND
Isleton
TYLER
STATEN
SUISUN MARSH SALINITY CONTROL GATE
Collinsville
SACRAMENTO
TWITCHELL ISLAND
BOULDIN ISLAND
VAN SICKLE ISLAND
CHIPPS IS.
SHERMAN ISLAND
WEBB TRACT
VENICE ISLAND
EMPIRE TRACT
KING ISLAND
BISHOP TRACT
PITTSBURG
ANTIOCH
SAN JOAQUIN
FRANKS TRACT
BETHEL TRACT
MANDEVILLE ISLAND
RINDGE TRACT
HOTCHKISS TRACT
HOLLAND TRACT
BACON ISLAND
Mc DONALD TRACT
LOWER ROBERTS ISLAND
STOCKTON
CONTRA LOMA RESERVOIR
VEALE TRACT
PALM TRACT
LOWER JONES TRACT
ORWOOD TRACT
WOODWARD IS.
UPPER JONES TRACT
Brentwood
DISCOVERY BAY
MIDDLE ROBERTS ISLAND
Channel Dredging
VICTORIA ISLAND
BYRON TRACT
Byron
Flow Control Barriers
New Intake Structure
CLIFTON COURT FOREBAY
UPPER ROBERTS ISLAND
Fish Control Barrier
MANTECA
HARVEY O. BANKS DELTA PUMPING PLANT
TRACY PUMPING PLANT
FABIAN TRACT
STEWART TRACT
SOUTH BAY PUMPING PLANT
TRACY
DELTA-MENDOTA CANAL
CALIFORNIA AQUEDUCT
STANISLAUS RIVER
LEGEND
Sacramento, San Joaquin and Mokelumne Rivers
Delta Waterways
SACRAMENTO - SAN JOAQUIN DELTA
SCALE IN MILES

ALTERNATIVE 3D

5,000 CFS Pipeline I.F.
North Delta Improvements
South Delta Improvements
CVP-SWP Improvements
3.0 MAF Upstream Storage on Sac River Tributaries
500 TAF Upstream Storage on San Joaq River Tributaries
2.0 MAF Aqueduct Storage
200 TAF In-Delta Storage
500 TAF Groundwater Storage (Sacramento Valley)
500 TAF Groundwater Storage (San Joaquin Valley)

Setback Levees (typical)

Pipeline Isolated Facility

Channel Dredging

Flow Control Barriers

New Intake Structure

Fish Control Barrier

CVP-SWP Improvements : State of the Art Fish Screen Facilities and Intertie between CCFB-Tracy

LEGEND

Sacramento, San Joaquin and Mokelumne Rivers

Delta Waterways

SACRAMENTO – SAN JOAQUIN DELTA

2 0 2 4 6

SCALE IN MILES

83

D – 0 0 5 8 1 6

D-005816

ALTERNATIVE 3E

15,000 CFS Open Channel I.F.
North Delta Improvements
CVP-SWP Improvements
3.0 MAF Upstream Storage on Sac River Tributaries
500 TAF Upstream Storage on San Joaq River Tributaries
2.0 MAF Aqueduct Storage
200 TAF In-Delta Storage
500 TAF Groundwater Storage (Sacramento Valley)
500 TAF Groundwater Storage (San Joaquin Valley)

Open Channel Isolated Facility

CVP-SWP Improvements : State of the Art Fish Screen Facilities and Intertie between CCFB-Tracy

LEGEND

Sacramento, San Joaquin and Mokelumne Rivers

Delta Waterways

SACRAMENTO – SAN JOAQUIN DELTA

2 0 2 4 6

SCALE IN MILES

84

D—0 0 5 8 1 7

D-005817

ALTERNATIVE 3F

Chain of Lakes
North Delta Improvements
CVP-SWP Improvements
3.0 MAF Upstream Storage on Sac River Tributaries
500 TAF Upstream Storage on San Joaq River Tributaries
2.0 MAF Aqueduct Storage
500 TAF Groundwater Storage (Sacramento Valley)
500 TAF Groundwater Storage (San Joaquin Valley)

Delta Cross Channel Enlargements

North Delta Channel Improvements: Setback Channels (typical)

Siphons

Low Lift Pump and Siphons

CVP-SWP Improvements : State of the Art Fish Screen Facilities and Intertie between CCFB-Tracy

LEGEND

Sacramento, San Joaquin and Mokelumne Rivers

Delta Waterways

SACRAMENTO – SAN JOAQUIN DELTA

2 0 2 4 6

SCALE IN MILES

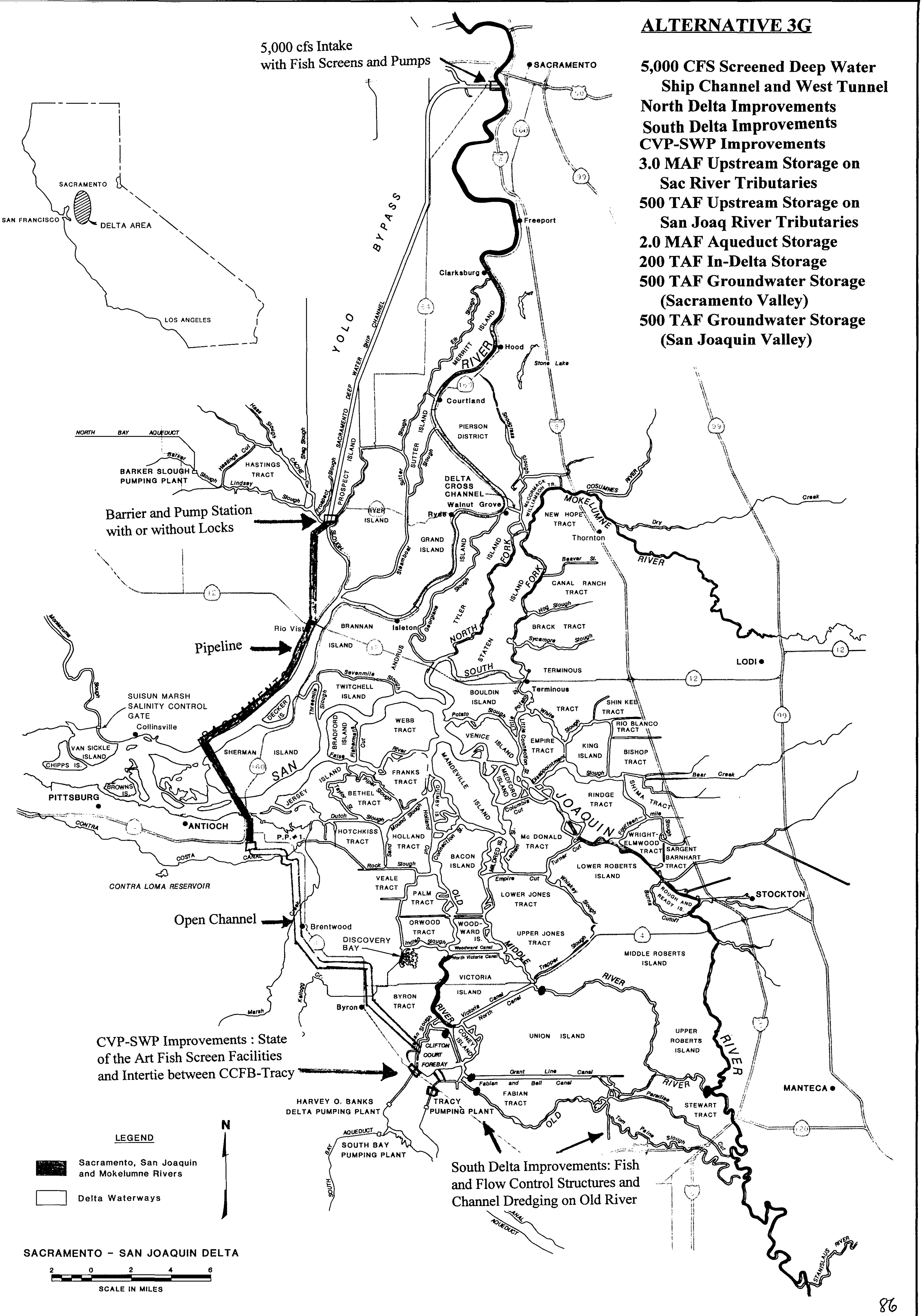
95

D – 0 0 5 8 1 8

D-005818

ALTERNATIVE 3G

5,000 CFS Screened Deep Water Ship Channel and West Tunnel
North Delta Improvements
South Delta Improvements
CVP-SWP Improvements
3.0 MAF Upstream Storage on Sac River Tributaries
500 TAF Upstream Storage on San Joaq River Tributaries
2.0 MAF Aqueduct Storage
200 TAF In-Delta Storage
500 TAF Groundwater Storage (Sacramento Valley)
500 TAF Groundwater Storage (San Joaquin Valley)



ALTERNATIVE 3H

5,000 CFS Open Channel I.F.
Tyler Island Habitat
Mokelumne River Floodway (West)
East Delta Habitat
South Delta Habitat
CVP-SWP Improvements
3.0 MAF Upstream Storage on Sac River Tributaries
500 TAF Upstream Storage on San Joaq River Tributaries
2.0 MAF Aqueduct Storage
500 TAF Groundwater Storage (Sacramento Valley)
500 TAF Groundwater Storage (San Joaquin Valley)

Mokelumne River Floodway Including Bouldin Island Used as Aquatic Habitat

Open Channel Isolated Facility

East Delta Wetlands Habitat

South Delta Habitat with Setback Levees

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LEGEND

Sacramento, San Joaquin and Mokelumne Rivers

Delta Waterways

SACRAMENTO – SAN JOAQUIN DELTA

2 0 2 4 6

SCALE IN MILES

87

D—005820

D-005820

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